

Thursday, July 14, 1983

## Temporary staff Bill is diluted

by John Riley

THE controversial Euro-Bill on temporary workers which is bitterly opposed by the UK computer services industry was watered down in the European Parliament in Strasbourg last week.

The scrapped clauses included provisions that contract work should be limited to three months; that companies reveal to their permanent staff the qualifications and rates of pay of temporary staff, as well as the fees paid to contract agencies; and that agencies should be forbidden to charge a transfer fee or the contract worker takes on a permanent job with the client.

Another controversial clause, that temporary staff should be paid the same as permanent staff, was amended so that their remuneration must be "at least equal" to that of permanent staff, allowing higher rates of pay.

All contract agencies must be authorised by the relevant bodies in each country and if contract

agencies are not registered and go out of business, then the client company incurs joint and several liability for the wages and so on of the temporary worker. The original proposal demanded secondary liability.

In a preliminary comment Ic Clark, UK sales manager of Knight Programming Support and the Computer Services Association representative on a committee set up to oppose the EEC legislation, said: "Most of the sting seems to have been taken out of it, but the implications of social benefits need to be evaluated."

The Confederation of British Industry opposes the whole legislation in principle and objects to the clause that details of temporary work must be defined in writing.

A formal comment by the CBI also opposed the use of the word remuneration as it "could cover a number of items such as non-contributory pension arrangements, interest free loans and increments to long service which would be unrealistic to extend to temporary workers."

## Atari replaces its chairman

by Robert Parry and Kevin Cahill

ALLING video game and micro builder Atari has replaced its chairman and chief executive of five years Raymond Kassar. James Morgan, from cigarette maker Philip Morris, will take over from Kassar, who has resigned his post but remains with Atari as a consultant.

Atari, a subsidiary of Warner Communications, is bidding to regain its position at the top of the consumer electronics tree. It reported an operating loss of \$46 million for the first quarter of this year, with a larger second quarter loss expected, and is laying off employees by the thousand while moving manufacture to the Far East.

As well as the personal computer market, which Atari is attacking at all levels up to 16-bit with

IBM PC look-alikes, the company is planning to move into the telecoms line with a range of computer-based phones to be introduced under the Atari badge.

The US Securities and Exchange Commission added to Kassar's troubles last December when it launched an investigation into alleged insider trading by Kassar and others. The investigation continues, but is said to have no bearing on Kassar's resignation.

Meanwhile, at arch-rival Commodore, there is also change at the top. In the words of the US press, Jack Tramiel, the ebullient president of Commodore International, has taken over — "again".

Tramiel, who is founder and chief executive officer of Commodore International which is based in Bermuda, hired Bob Lane as president of Commodore's North American operations just seven

months ago.

Three weeks ago Lane left the company, following a long line of short stay senior executives.

The company described Lane's tenure as a trial period which did not work out. Lane came to Commodore from Northern Telecoms. He was not available for comment.

Commodore has reported rapidly rising sales for the first two quarters of this year, based on a major expansion in North America, which has not been its traditional key market.

The rise in sales comes in the wake of a rapid expansion in North American manufacturing capacity, alongside a \$6 million plus advertising campaign.

Commodore has so far shown no signs of suffering from the price attrition in the lower end of the market which has hit Atari and Texas Instruments.



OAKLEY... Warns British to beware of poachers.

## Academics are selling souls abroad — Oakley

by George Black

SOME British academic researchers are selling their souls to foreign firms, according to Brian Oakley, director of the Avey programme.

Oakley, who is in charge of the official five-year national computer plan, was speaking at a conference on collaboration between higher education and industry. The conference was organised by the Institute of Manpower Studies in conjunction with the Times Higher Educational Supplement at the London Business School.

Oakley warned British firms to beware of foreign rivals "pinching our technology from the very mouths of the academics".

The answer to the problem lay in the hands of UK industry, he said. It was causing British firms to take the academic world that bit more seriously.

"There is nothing like financial hunger in the academic world to stimulate co-operation with industry."

The drain of discoveries and inventions to foreign firms was a threat the country ought to take

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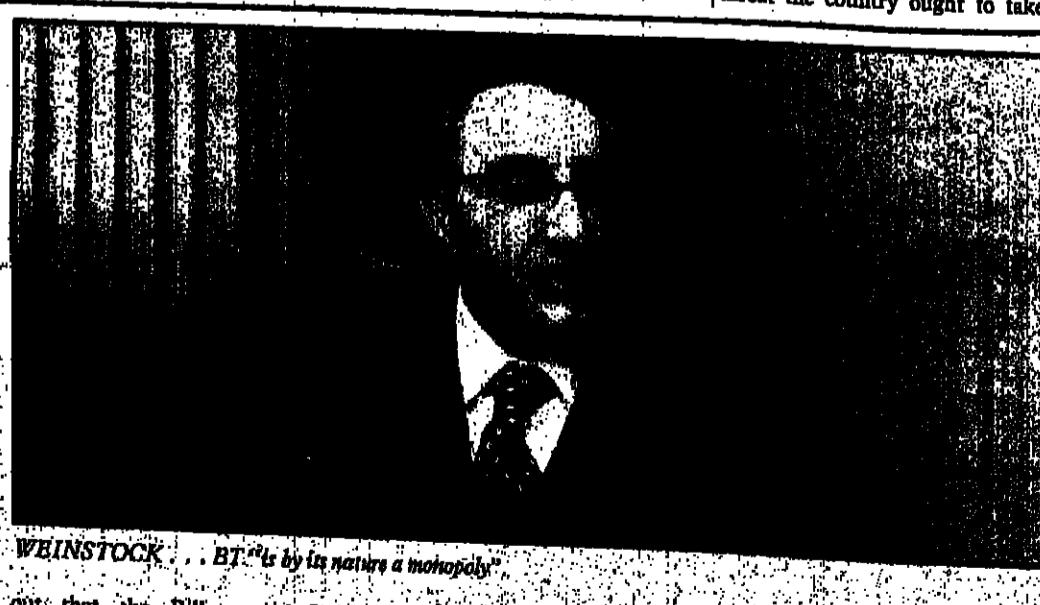


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WEINSTOCK... BT is by its nature a monopoly

out that the Bill now before Parliament did not allow for this.

Lord Weinstock also called indirectly for a "Buy-British" policy.

Questioned on the government's

business bid, Weinstock pointed

out that the Bill now before Parliament did not allow for this.

This comment comes in the wake of reports that BT is talking to US giants IBM and American Telephone and Telegraph about the sale of US communications

equipment in the UK. Earlier this year BT chairman Sir George Jeffery, a native of the UK, suggested that a "Buy-British" policy

should be adopted to protect potential over seas and foreign investment in the UK.

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## Regretful Prime pins hopes on new mini

by John Riley  
US MINICOMPUTER manufacturer Prime launched its new flagship 32-bit supermini last week as it confessed to a failure to meet its sales targets.

And it is slashing prices on its existing superminis by up to 20%.

The new 9950 model offers, according to Prime, 50% more processing performance than the previous top end 850 machine at 10% more of the cost.

It is based on Prime's Primos operating system and supports up to 128 point-to-point terminals.

The full configuration of 16 Mbytes main memory is contained in eight two Mbyte self interleaving boards.

Architectural features include five stage synchronous pipeline with branch cache, high speed emitter coupled logic circuitry, quad precision floating point and microdiagnostics.

"The 9950 has full compatibility with the rest of the 50 range," said Prime's new UK managing director Malcolm Padina. "It will run object code on our original Prime 300 machine. That's what we mean by compatibility."

In addition to the 9950 launch, the company also announced price reductions on its 500 by and one Mbyte memory boards, and also a new intelligent communications



PADINA . . . "New machine runs object code on original 300."

subsystem (ICS 2) which supports up to 64 asynchronous lines from a single I/O slot. A further addition is a magnetic streaming tape subsystem for the Prime 2250 minicomputer.

The announcements were made in the same week that the company revealed that second quarter results show a \$5 million shortfall on the first quarter's results and a 25% drop in earnings. The company claims that delay in orders was the cause and not loss of trade to competitors.

Padina commented: "Prime UK and other subsidiaries have overperformed on goals — in the case

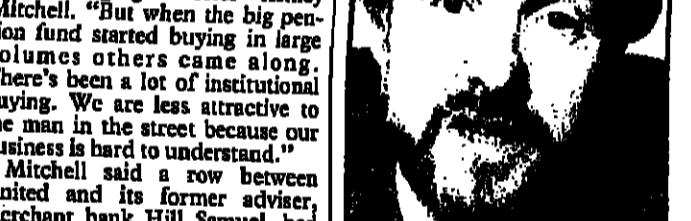
## United's shares hold up after a week's trading

UNITED Leasing shares held up well in their first week on the Stock Exchange despite disappointing demand before trading began.

Barclays Merchant Bank and a group of sub-underwriters had been left with half the four million £1.40 shares after a disastrous offer for sale by public tender before trading began.

And when the shares hit the Stock Exchange the price dropped quickly to £1.33 many of those underwriters rushed to get rid of their shares.

But a big institutional investor started buying hundreds of thousands of shares on the first day and the price recovered to close at £1.40. The price then stayed steady through the week.



HAYFORD . . . Distributed future.

"We expected a drop to £1.20," said managing director Ashley Mitchell. "But when the big pension fund started buying in large volumes others came along. There's been a lot of institutional buying. We are less attractive to the man in the street because our business is hard to understand."

Mitchell said a row between United and its former adviser, merchant bank Hill Samuel, had also hit the public tender.

The share placing raised £4.5 million to back the IBM leasing specialist's expansion in the US and Europe. Chairman Parryn Mitchell said the US operation was a "sensational" success.

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## Prism puts cartridges

by Donald Kennett  
SOFTWARE distribution by programmable ROM cartridge goes on a market trial in Birmingham this autumn.

The trial will be run by Prism Microproducts, the supplier of software and interfaces for EMAP's Microline 800 telesoftware service on Prestel, in preparation for launching it nationally early next year.

Prism managing director Bob

Upton said the service would be a logical extension to the company's present software merchandising activities, as well as to Micronet 800. Micronet will be used to distribute software from publisher to retailer and to collect details of sales and royalty payments.

The service will be based on blank cartridges, called ECPCs (Edge Connector Programmable Cartridges), from Romox Pro-

gramming Terminal in the shop.

This means that nobody in the chain will get stuck with stocks of programs that do not sell as well as expected, nor will they suffer from short supply of popular programs.

Cartridges themselves have

many advantages in terms of ease of access and ease of handling. They need no expensive disk mechanisms on the machine.

The bulk of the software will be distributed by the system as it is expected to be games. They will be implemented for the Atari, Amiga and Coleco game consoles and for the Atari 400 and 800, Commodore VIC-20 and 64, and Texas Instruments TI-99/4A home computers first.

Prism will be made in Japan to German design. It is de-

signed to comply with new regulations on ergonomic design which will be introduced in Germany in 1984.

Triumph Adler's present network of 160 dealers will be responsible for selling the personal computer. Hayford said that at a later date his company may look for specialist outlets such as mail order or computer shops. It will start off by addressing its current market and then moving on to the skilled hobbyist.

Hayford stressed that the dealer

operation is the most important

outlet. "The future is in the distribution network," he said.

In fact, Triumph Adler has now concentrated all its sales efforts behind indirect sales. Commenting on this decision Hayford said:

"The alphabetic micro range is now being sold by over 160 dealers and a number of experienced software houses have now taken up the 1600 mini range as well."

"We felt the need to position ourselves solidly behind our dealers."

He explained that the reseller will mean more support for the dealers and the end of any possibility of conflict between the direct and indirect salesforce.

A customer support team has been formed.

"Should any specific com-

plaints arise, the centralised

control of support executives in London means that the post with the specialised knowledge will be directly allocated to deal with it," said Hayford.

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# Big disc rivals challenge IBM

by John Kavanagh  
IBM is about to face stiff competition in the big disc market. Plug-compatible manufacturers BASF, Memorex and Storage Technology are in the final testing stages at user sites for their rivals to IBM's 3380 2,500Mbyte disc system.

IBM was hit by manufacturing problems early last year, but an independent survey in April showed that the 3380 was now the most reliable disc system ever.

The company had shipped over 15,000 units by the end of May.

But IBM's rivals now expect to make an impact.

Colin Cook, European marketing manager at Storage Technology, said: "Our first test was at a bank in Denver and other test systems are going in this month. These systems will take off like a

rocket. We have masses of orders even before we go into production."

Cook agreed with a forecast by research firm Frost and Sullivan which showed a trebling of sales to \$1,000 million this year and a further doubling in 1984.

But Peter Harper, head of marketing at BASF's UK computing division, said users were still feeling their way. "IBM expected a tremendous influx of 3380s, but so far we've found users prefer to take one string of discs and experiment with it," he said.

Cook quoted a US market survey which said the read-only optical disc business could be worth \$5,000 million by 1990.

Harper said BASF was working on optical discs, but he felt wide use of such systems was two or three years off.

One UK site went from 3350s

to 3380s in a weekend, but we think that's a bit risky."

While big discs are taking off, Cook said the 3380 market could soon be threatened by optical discs. At the start of next year Storage Technology could announce



COOK . . . "We have masses of orders even before we go into production."

## Wicat takes over Europe arm

by George Black  
WICAT, the Utah firm which was first in the field with its 68000-chip supermicro, is taking over its own European organisation from its agent, Atech of Zurich.

The operation is being headed by Roger Llewellyn, recruited a month ago from rival 68Kbyte micro maker Altos.

Llewellyn, formerly of Prime and Hewlett-Packard, spent two years with Altos setting up its European division as its North European sales manager.

His chair at Altos has now been filled by another ex-Prime man, Peter Thomas.

Wicat is about to open a second British office to back up the Birmingham base which began work 14 months ago. The new one is likely to be at either Bracknell or Cambridge.

To back up the expansion Wicat raised almost \$80 million on the New York stock exchange last week with an issue of four million shares.

Company spokesmen said the intention had been to issue only three million, but more had been offered by public demand.

The coming drive will be aimed at large dealers, software houses and systems builders and technical colleges.



LLEWELLYN . . . "Wicat CBT package was first serious challenge."

## Jobcentres are poised to link up in national network

by Nuala Moran

NEXT month sees the start-up of the final link in the Manpower Services Commission's national network of jobcentres.

The seventh Perkin-Elmer mini in the network will be commissioned in Basingstoke in three weeks. The machine will be linked through PENnet, the company's minicomputer networking system, to six other regional computer centres via British Telecom's Packet Switching System.

This means that 750 of the 1,000 jobcentres around the country will be able to communicate with each other, using Trend KSR printer terminals. Smaller jobcentres without terminals will communicate via a parent office. The cost of the network was £3.5 million and it took 4½ years to install.

The six regional centres already operational are at Newcastle, Bir-

mingham, Bristol, Glasgow, Leeds and London. The centres were isolated until late 1982 when they were linked via PENnet.

Each centre has a Perkin-Elmer 3230 mini running the Vacancy Circulation and Statistics System (Vacs).

Vacs has 25 transactions, including the production of vacancy printouts, free format message generation, input of data advising that a job has been filled, details of people going after a particular vacancy and statistical data input.

Installing the system speeded up the transmission of information about jobs. This means that vacancies are available to more people, over a wider area. One of the main advantages from the Manpower Services Commission's point of view is that the collection and preparation of job statistics is quicker and not so labour intensive.

Also in Sheffield, the commission is planning a national database of around 5,000 hard-to-fill jobs and jobs that will appeal to mobile jobseekers. These vacancies will be fed from the regional computers to a Perkin-Elmer 3210 mini in Sheffield.

Jobcentres will be able to contact Sheffield with requirements and VDU operators will search the database for suitable jobs. This system will be running by the end of 1983.

## DP Olympic finals teams are named

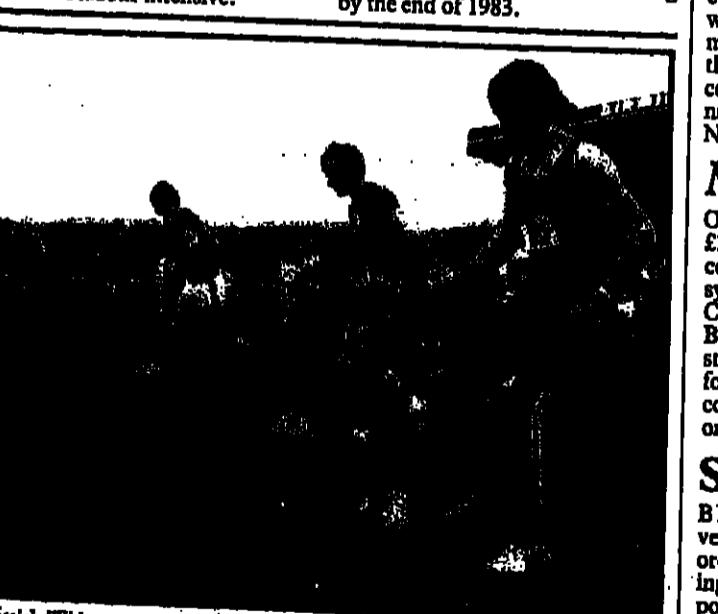
IT'S Computastars final time again and the 43 teams going to Birmingham on Saturday have been announced.

In addition to the main competition, Computastars returns. Eight male and female teams are entered for this tug of war contest, which proved to be one of the highlights of last year's final.

As if all this were not entertainment enough for one day, it would appear that Computer Weekly's sports reporter is likely to be pre-occupied into actually competing in a little extra something: So don't be surprised if he turns up wearing a fake plaster cast.

The show starts at 10.30 on Saturday July 23, and it will cost £1 to get in (50p for kids) to the Alexander Stadium, Birmingham. Don't miss it.

Teams, groups and numbers



Scottish Widows get the ball rolling in the Birmingham qualifier way back in April, when they finished second to Kalamazoo.

Group 4

1 Rank Xerox 1

2 Digital 2

3 Computer Special Systems (SU)

4 Computer Vision

5 Compu-File

Group 5

6 Thorn EMI

7 British President Institution

8 Ford Motor

9 Capicam (SU)

10 Legal & General Ass. Soc. (Vets)

Group 6

11 British Aerospace 2

12 British Aerospace 1

13 British Pharmaceutical

14 Sheffield Manufacturing Co (SU)

15 Haywood & Partners 1

16 Barclays Bank International 1

17 First Direct 1

18 Oxford University

19 London Borough of Lambeth

20 Crawford Computing 1

Group 7

21 Kalamazoo

22 Digital Services

23 University

24 British Rail Board

25 Rowntree Mackintosh 1

Group 8

26 Compu-File 2

27 Barclays Bank Radcliffe Hall

28 British Steel Corporation

29 Scottish Widows Fund & Life Soc

30 Robert Horse (SU)

31 Rowntree Mackintosh 2

Group 9

32 Compu-File 1

33 British Steel Corporation

34 Scottish Widows Fund & Life Soc

35 Robert Horse (SU)

Group 10

36 Compu-File 1

37 British Steel Corporation

38 Scottish Widows Fund & Life Soc

39 Robert Horse (SU)

40 Rowntree Mackintosh 2

## SALES BRIEF Barlow buys Scicon software

MATERIAL handling equipment supplier Barlow Handling has ordered the Scicon Distribution System software, developed by Scicon, with backing from the National Computer Centre. Software products support software. The system runs on Hewlett-Packard 3000 minis and Barlow will use it to process orders and monitor stock levels of 15,000 parts per line. It will run on minis in six divisional offices and communicate with terminals and printers in branch offices. The first of the four offices is due to go live by the end of the year.

## Data collection

THE Police National Computer Unit at Hendon is to install a diffusion Computers R2000 Telecentre for the collection of data to be passed via magnetic tape for processing on the unit's four B7700 mainframes. The system has a 128Mbyte memory, eight VDUs, a 3.5Mbyte disc and a 180 character per second printer. It replaces a paper-based system.

## Offices automate

DATA General has won a contract to supply an office automation system supporting 14,000 users in 800 locations over the next eight years for the US Department of Agriculture's forest service. More than 800 systems based on D640 series 32-bit minis running DCE (Comprehensive Executive Office) software are to be installed in the first three years. They have an average value of \$85,000 at bringing the three-year total to

£1.2 million.

## Poly simulates

LIVERPOOL Polytechnic has bought its third Solartron marine navigation instrument simulator in 15 years. The latest system, which cost £250,000, uses a Digital Equipment PDP-11/34 to generate a radar coastline image from chart data. In place of the optical system based on photographic plates it was used in earlier models. It includes an instructor's console which can be used to enter and manoeuvre up to 24 target ships on the screens of the three navigational consoles. The system can simulate navigational aids such as Data Navigator and Loran C.

## Monitor the heat

OXFORD Automation has won a £230,000 order for computer-controlled temperature monitoring systems for two reactors at the Central Electricity Generating Board's Berkeley nuclear power station in Gloucestershire. Oxford's System 86 monitoring and control equipment has now been ordered by four CEBG regions.

## Seventh Bliss

BEAUFORT Computer Developments has won the seventh order for its Bliss insurance servicing software from Insurance Corporation of Ireland. The software will run on the corporation's IBM 4300, allowing staff to process new business interactively. It will also produce policy documents and letters automatically in support of life and unit trust linked insurance.

## ICI picks Merit

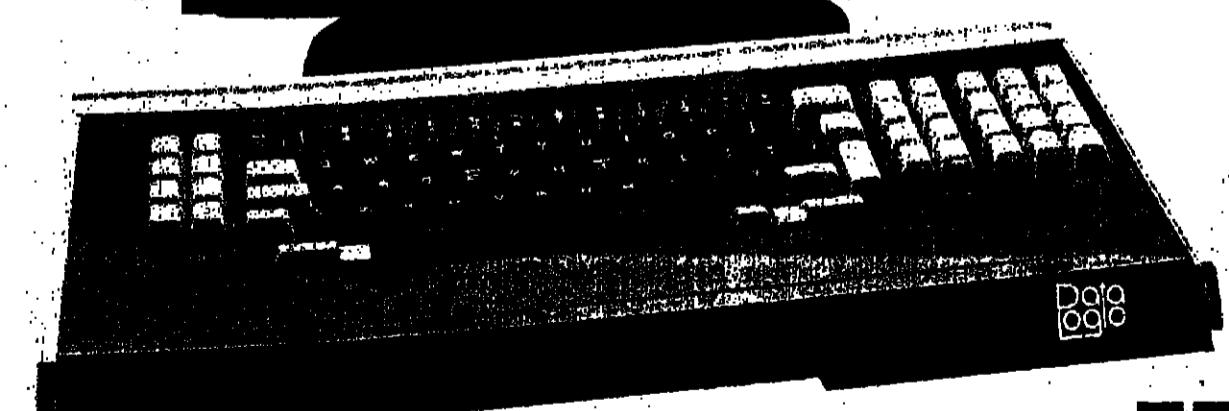
WIGAN-based Merit Computers has supplied a 10-terminal local area network, based in Digital Micro Systems hardware for use in the foreign exchange dealing room at ICI's London office. Merit has been involved in the specification and development of the system from the early stages. ICI previously used a timesharing bureau to manage loans, bookings and foreign exchange dealings, but wanted quicker access to management information.

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Data Logic

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SWINBANK . . . "Many have tried and failed."

## Hytec is high and aims to get higher

By Donald Kennett

OXFORD-based Hytec Microsystems is aiming to be the top UK supplier of mainframe terminals and to crown the position with an offer on the Unlisted Securities Market within two years.

Joint managing director Chris Swinbank said: "Starting from nothing three years ago we've become number one terminal supplier in the ICL market."

"This year, we've developed and manufactured our own machine. Let's say we've consolidated the group. It's not enough just to make lots of sales, you have to develop your managers, make sure you handle your finances right — there are many things you have to consider besides having a good product."

Swinbank and his partner Chris Howe-Davies started the company in 1979 as a distributor of 280-based CP/M microcomputers from ECS in the US. From their background in ICL mainframes, they wanted to move into micros because the market was starting to boom.

But to differentiate its product it

implemented ICL's communica-

tions protocols. By the end of 1981 it had all three — CO1, CO2 and CO3 — and it claims that it is still the only company to have all three available on the same device.

"Many have tried and failed," said Swinbank. "We don't find it difficult but others seem to."

"We're expanding our profile from being a micro vendor to being in terminal sales. Now we're moving into the Honeywell market. We've been doing it for nine months, but we've sold by request rather than by any significant effort. Now that we've developed the product and got people using it, we can expand. And we're doing the same with Burroughs."

"Where we see the greatest growth is in the business system to mini market. The bottom end of the mainframe market is going to go into decline and be replaced by large micros, networking and so on. The top end will be large powerful mainframes doing number crunching, large databases and batch processing. The rest of the distributed market will be micros."

The company is developing a 32-bit microcomputer to expand its activities into the heavyweight end in about 18 months. It is using the National Semiconductor chip in its development work, but Swinbank says it may use any of the large number of equivalents it expects to appear by then.

"Using our experience on that side of the market we will implement mainframe-type operating systems on micros. The operating systems will be a pretty significant part of our products," he said.

"To that we will add networking. We've got networking today, but with very powerful networking.

Ethernet, some other form of network, it doesn't really matter — we'll be moving towards the mini market and the bottom end of the mainframe market."

"We believe that 32-bit operation is a plateau — that's as far as people are going to go. So rather than go through 16-bit in the interim we'll go straight to 32-bit. That will provide you with facilities that a small mainframe does today — number crunching, transaction processing, networking, interaction with any programs running on the central machine integrating with local processing."

The company is developing a 32-bit microcomputer to expand



By Howard Karten

IBM HAS launched a programme whereby independent software and service firms who help IBM sell and install certain hardware on speculation, package the hardware with software, and sell the entire system to end-users.

Under the programme, software houses and others selected in advance by IBM will assist IBM in making the sales of IBM PCs, PC-XTs, System 23, Displaywriters and System 34s, 36s and 38s.

Several dozen such vendors have already been signed up by IBM, which declined to identify the organisations. It will be IBM itself which makes the sale and remains responsible for fundamental service and support.

The program, currently operat-

ing only in the US, is distinct from maximum of six such SSOs, and PCs a maximum of five.

It is only very recently that IBM has allowed non-IBM organisations to peddle iron with the IBM logo. For example, in the US, Sears, Roebuck, a large retailer, and Computerland, a retailing franchise operation, and some other computer retail operations, sell IBM systems.

Thus, although this programme is distinct from VARs, SSOs and big blue could wind up competing in some senses with VARs.

For years, IBM, via a very strict code of employee ethics, has attempted to restrain some of the more exuberant or potentially downright unethical activities of its sales force by headquarters review of almost all sales. Thus IBM will still retain final control and be able to review sales contracts.

## ICL cuts its quarterly rents to save money

by Nuala Moran

ICL IS cutting its rental by 12%

per year for customers who agree

to go from monthly to quarterly

billing.

The company is going to bill

quarterly in advance for hardware

and software rentals to bring it into

line with maintenance, which is

already billed quarterly. This

means users must find three

months rental charges in one go,

and the ICL Computer Users As-

sociation protested that members'

cashflow would be jeopardised.

ICL agreed to the discount after

talks with the users' association.

Chairman of the association, David Kelson of Dupont Computers said: "The negotiations undertaken give a 1% per month discount which must satisfy the fears of most of our users who objected."

"The protest is not a criticism of going quarterly, it is that it will improve ICL's cashflow at the users' expense," he complained.

Only users currently on monthly billing who change to quarterly will get the discount. All new contracts being issued by ICL have quarterly invoicing, and people attracted by the discount have until

January 1984 to go over from monthly to quarterly. There is no compunction to change but Kelson said: "There is now a case which gives an opportunity for users to go quarterly without penalty."

Commenting on whether or not he thought the discount would be clawed back in price rises, Kelson said: "There is no guarantee whatsoever that prices won't rise, but by saying that quarterly billing will improve cashflow, ICL makes that possibility remote."

Improving the company's cashflow was not the main consideration in making the changeover, accord-

ing to an ICL spokesman, who said: "The motive is simply to help users and ICL reduce their costs."

Kelson supports that aim. He said: "It means doing less administration and will therefore give the invoicing section more time to be more efficient."

A recent ICL user survey showed that customer invoicing was causing problems because a proportion of bills were incorrect and difficulties arose in getting them amended. There had also been major delays between installing equipment and sending invoices.

"Our growth is constrained by

cash and the availability of senior people," said managing director Keith Meadows. "Customers tend to be very busy and such contracts require high initial investment."

"When we took the Xa

Giro contract it cost us £2.4m

set up stocks of spares, train

and allocate people in the

days when there was no revenue.

Meadows said DPCe is expanding very rapidly in the UK and was considering further

expansion. The company has

customers in the Netherlands

and Germany.

Meadows added that DPCe has been approached about partnerships by companies in the East and Middle East.

in the UK at the launch of the product last week at the IBM User Show.

He said: "We think that this will be the solution to the DP manager's problems with micros. It will bring the control of computers back to the DP department."

SyFAnet, announced 18 months ago, is a broadband based LAN with IBM SNA (Systems Network Architecture) compatibility. Computer Automation claims that it can connect all the major micros to a central mainframe machine. The system links any device with a RS232 interface.

Computer Automation has launched its own micro, based on the Intel 8088 chip running under CP/M-86 with a range of Winchester and floppy disk drives.

In the UK the new sales team will be split between the south, the midlands and the north and the company plans to open a regional office in Scotland within the next six months.

And marketing communications manager, Roger Charters, claimed his first two successes for SyFAnet

## French suffer as IT imports rise

by Jack Gee

FRANCE's information technology industry continues to lose ground on its domestic market to foreign competition as more and more French firms equip themselves with computer systems and peripherals, a major report has revealed in Paris.

The National Association of Manufacturers of Computer Systems, Peripherals and Telematics applications says that although turnover rose by 28% last year to over 34 billion francs (\$3.1 billion) and one-third of production was exported, imports of office equipment increased by 27% and computers by 41%.

The association's report says: "The increased sales of foreign manufacturers reflects the inadequacies of our own national production in the fields of microcomputers and microsystems, peripherals and office equipment."

The report adds: "While exports have been picking up on the

markets of our principal European partners where access was very difficult throughout 1982, the home market — particularly for small business customers, shows worry-

ing symptoms of running out of steam. If this situation worsened, the situation would be serious."

President Riviere told Jean Claude Hirel, the French industry ministry's information technology chief, that the French computer industry was suffering from a shortage of engineers and technicians and the absence of a genuine policy of industrial standards.

Riviere also complained that manufacturers were uneasy because of a threat to impose new, higher rates of VAT on display screens and increasing difficulties in obtaining access to financial markets.

Hirel replied that cash aid of various types will provide 1.3 billion francs (£120 million) to help develop new computer products and encourage the expansion of firms in the industry this year.

## From the dole to a £30,000 fellowship

by George Black

THE FIRST industrial research fellowship to be granted by the Wolfson Foundation for a computer project has gone to Elizabeth Polden.

She got a £30,000 grant for a two-year project in expert systems after being out of work for two years.

"After I got my PhD in information sciences I sent about three dozen applications, but didn't get a single interview," she said. "I seemed to have overqualified myself."

Wolfson fellowships are aimed at bringing industry and education closer and particularly at placing redundant boffins where they can be used.

She will be working in the department of management science at London's Imperial College on a project to develop a Prolog language system serving small businesses. She recently spent a week with Expert Systems of Oxford learning the language. An interim report on her progress has to be made to Wolfson in eight months.

She plans to visit artificial intelligence guru Donald Michie in Edinburgh in August as well as attending a session at Sterling University.

Much of her time will be spent with British firms researching the requirements of the knowledge base.

Her supervisor, John Jenkins, commented: "Expert systems packages have so far singularly failed

## Microdata wins BT's personnel

by John Riley

MINICOMPUTER manufacturer Microdata Information Systems beat off the big boys to win a £6 million contract to supply British Telecom with a real time personnel system.

In all, 70 Microdata Reality minicomputers plus peripherals, together with software developed by software house Ibis will computerise British Telecom's 246,000 employee records by August 1984. Work has already begun and eight systems have already been installed.

To Jerry Causely, managing director of Microdata Information Systems, the deal vindicates his strategy of concentrating on vertical markets. "To combat IBM, ICL and the others, we have to become specialists," he said. "Personnel systems are important because they open doors. Every major company needs one and they are taking on a more significant management role in those companies."

Microdata, a subsidiary of the US giant McDonnell Douglas, specialises in personnel and library systems and local authority applications and is working on a manufacturing and control system.

The company manufactures minicomputers and peripherals in Hemel Hempstead. Causely believes that a major strength is to form exclusive long term relationships with a limited number of software houses. To that end he has already struck up such relationships with Ibis and Debdensofts Interactive Systems.

The British Telecom system, called Prism (personnel related information system for management), comprise three interactive files

holding current personnel information. These files hold data on employees, on the organisational structure and on grade and job description. Security ensures that the information is only accessed by personnel on a need to know basis, and British Telecom says that every employee will receive an annual copy of his record.

Microdata Information Systems concentrates on replicating mainframe systems with minicomputer systems, and the advanced corporation "We're going more for £200,000 market place," says Causely. "We're not displacing the mainframe system which can take up

to three weeks to produce information. It will be quick for managers to make quick decisions. Security ensures that the information is only accessed by personnel on a need to know basis, and British Telecom says that every employee will receive an annual copy of his record.

According to British Telecom,

the system will reduce clerical

work and provide information rapidly as opposed to the present

manual system which can take up

Electric, Control Data, Tymshare and IBM in the United States.

Processing is not so far accounted for 80% of CISI's activity and intellectual input has been its shortcoming which chairman Nollet hopes to remedy by the partnership with Wharton. CISI's current turnover is one billion francs (£90 million) — equal to its major competitors, SG2, GSI and CAP Gemini-Sogeti. But last year it lost £3 million (£630,000).

The deal between Wharton and CISI has annoyed France's state-owned Compagnie Generale d'Electricite which was counting on French government support for its subsidiary GSI to turn it into a leading economic forecasting firm.

France's national statistical institute, INSEE is also irritated by the prospect that its own economic forecasts, which have so far been regarded as gospel by French industry and government agencies, could now face rivalry from a firm in which one of the United States, leading economists is a moving figure.

Chairman Nollet says he is confident he can double turnover to 2 billion francs (£180 million) by 1986. Since he took charge at CISI in 1974, 50-year-old Nollet has set up or bought 10 foreign subsidiaries in Britain, Spain, West Germany, Brazil and the United States.

## IBM will reward its helpers

by Howard Karten

IBM HAS launched a programme whereby independent software and service firms who help IBM sell and install certain hardware on speculation, package the hardware with software, and sell the entire system to end-users.

Under the programme, software houses and others selected in advance by IBM will assist IBM in making the sales of IBM PCs, PC-XTs, System 23, Displaywriters and System 34s, 36s and 38s.

Several dozen such vendors have already been signed up by IBM, which declined to identify the organisations. It will be IBM itself which makes the sale and remains responsible for fundamental service and support.

The program, currently operat-

ing only in the US, is distinct from maximum of six such SSOs, and PCs a maximum of five.

It is only very recently that IBM has allowed non-IBM organisations to peddle iron with the IBM logo. For example, in the US, Sears, Roebuck, a large retailer, and Computerland, a retailing franchise operation, and some other computer retail operations, sell IBM systems.

Under the new programme, IBM's national marketing division's 150 sales offices and 44 product centres will each select software and service organisations (SSOs) with proven expertise in a particular field.

Asked why customers may soon begin seeing sales people who in effect represent big blue in uniforms other than the traditional white shirt-waist tip shoes-dark suit-regimental striped tie, an IBM spokesman said: "The market is expanding very rapidly and we're trying to provide our customers with the best service we possibly

can. We'll still be involved all the way though and we're still responsible for the product once it's installed."

The SSO will assist IBM in making the sale, the spokesman emphasised.

Thus, although this programme

## NEWS ANALYSIS

Kevin Cahill called on a small US outfit and found...

# What the Giro and the Falklands had in common

WHAT unites an element of Britain's victory in the Falklands with the National Girobank?

Not, as you might first assume, anything obvious like money or the Post Office, but a small and to some extent relatively unknown American company called Lundy Electronics.

Based at Glen Head, an hour's run along the Babylon section of the Long Island railroad out of New York's Penn Central Station, Lundy had the slightly paradoxical distinction of supplying the RAF with what turned out to be the

oldest and most effective anti-radar, and consequently anti-missile, defence of all.

This is chaff, a very finely chopped up version of its foil, which is scattered from pods aboard an aircraft, and which provides a complete screen for aircraft being scanned by enemy radar – in the case of the Falklands, by Argentinian radar.

There are even rumours that the form of chaff supplied by Lundy was many times more effective than the beamed electronic counter measures now so expensively

popular with the world's air forces. But where does the Giro come into all this?

It comes in because Lundy supplied National Girobank at Bootle, Merseyside, with its huge, some say the biggest, single optical character recognition (OCR) installation in the world.

The OCR stations at Bootle, 300 in all, are used by National Giro to read key account data on cheques and payments coming into the centre at the rate of around one million a day.

It's a marvelous reference site and Adam Askew, Lundy's UK



GOOSE GREEN... And a Hercules approaches over-wrecked Argentine aircraft.

managing director, is enthusiastic about future orders at Giro and the Post Office. Askew is perhaps the ideal person to explain the apparent paradox of a company with a turnover of just \$28 million last year that is a key supplier in three widely disparate areas of high technology.

He was the national marketing manager of Farrington Data Producers, the source of Lundy's OCR equipment and expertise, and has been with that technology "for longer than he cares to remember".

Farrington Data went into liquidation in the early seventies under the accumulated weight of a huge stockpile of the then massive 3030 page OCR readers, but also owning many of the original patents in the OCR and, indeed, voice recognition field.

Lundy, a very small electronics company with a staff factory in Florida and an electronics factory on Long Island, decided that it could use the data input capabilities of the Farrington equipment and bought out that part of the company from the receiver.

At about the same time Lundy had begun to develop an early CAD workstation and some software, which it was marketing on a virtually one off basis in the US.

"Back in those days OCR was big kit, really big. The 3030 page reader, which was limited to just two fonts, OCR-A and OCR-B, weighed nearly a ton," according to Askew.

Now, the equivalent to the 3030 comes in the form of Lundy's newest product, a desktop page reader that can read up to seven print fonts, including standard pica and elite, two of the commonest typefaces.

According to Askew the Lundy low cost page reader, which is close to breaking the print format barrier which has always been the major handicap to widespread OCR use, will be used principally for applications like word processing, cataloguing and so on.

Lundy, which still retains the Farrington name in its UK title, has always exercised an unusual degree of freedom for a UK subsidiary of a US based company, but even in the recent past up to 50% of Lundy's turnover has come from Stout.

This is now changing, along with the public fortunes of the company, which has become one of Wall Street's widely tipped share potential winners. Part of the reason for the change and the rapid growth at Lundy is generally credited to Bill Stout, the ex-Storage Technology executive who became the company's chief executive on the founder's death three years ago.

With the owner's death the company was able to release a large block of shares and raise funds from the subsequent stock sale, which was augmented by a windfall legacy in the shape of the founder's life insurance policy which brought in \$3 million.

This gave Stout just the cash he needed to start the company into a cautious but highly successful development of its data input expertise and technology, leading to

a whole range of new, integrated, OCR based products.

The one the company is to show off is its new bank machine which combines a usual bank teller data entry

activities with the ability to check and redisplay a customer's signature.

The whole device, off

FMS, is little bigger than

a standard Apple II system

arrangements by November – in time for Computer Weekly's own trade show, Compec.

The CCTA's fear is that microfloppy discs will take off as mass storage media for portable micros that will bridge domestic and business use before any consensus arises. CCTA is concerned that there will be problems both of compatibility and in the bulk purchase of disc media should several systems become common.

It wants to set a standard for size

and format so that discs can be read by the various different makes of micro found in the public sector.

But any proposal the group comes up with will be a recommendation, rather than a standard.

So far, with a £37 million order

from ACT for drives for Apricot,

the Sony drive is the only one to be adopted by any serious British manufacturer.

Meanwhile Hitachi is gearing up to get moving with large volume deliveries of its 3-inch drive.

"We welcome the CCTA move," says Ted Marshall, Hitachi computer products manager, "and would be very happy to talk to them."

Hitachi with a 3-inch.

There is still a dark horse – IBM with a much-rumoured 3.9-inch product – and there's a fourth contender in the form of a 3½-inch system supported by Dynas, Segate and Tabor.

The Sony drive has attracted a large band of supporters, headed by Tandon and Shugart, and Sony has been actively lobbying to get its proposal accepted as standard.

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"We welcome the CCTA move," says Ted Marshall, Hitachi computer products manager, "and would be very happy to talk to them."

## Floppy standards are on the cards



MARSHALL... Welcomes the CCTA initiative.

## Portico follows M & S and Avis

NEWCOMER to the British micro scene, Portico Technology, is going for the Marks & Spencer approach. And the Avis way.

Manufacturer of its Miracle portable machine is sub-contracted out, using the Marks & Spencer approach, says managing director Geoffrey Smith. "We buy the best, and get it quick," he says. "And like Avis, we try harder," he adds.

The Miracle is a no-nonsense, eight-bit machine – built to the "transportable" formula pioneered by Osborne, with integral screen and discs and the keyboard forming the closing side of the box.

Like Osborne, Portico has gone for the bundled software approach, including word processing, data management and spreadsheet application packages from Chang Labs in the US with CP/M and system utilities in the £1,795 basic price.

But the main software feature that will appeal to the first-time users Portico is pushing for is its Operating Guide package, written by Decision Systems, the software house Portico sales director Mary Tattan comes from. Where CP/M was written for machines, the Operating Guide was written for people, says Tattan.

It hides CP/M tasks behind a straightforward menu system, prompting users through operations like copying discs and checking on available file space, in simple stages. This software is being marketed by MPI, and has found favour already with micro suppliers without problems.

Tandon attempted to rectify the problems, but later shipments were still faulty, so Torch cancelled the contract. Since then it has used drives from several other suppliers without problems.

In last week's news of GEC's purchase of 76% of Torch, the price GEC paid was inflated by a misplaced decimal point. GEC bought out the original backers for £3.25 million, not £32.5 million.

The Miracle has a few tricks up its sleeve on the hardware front too. The machine comes with 64Kbyte of cache memory, as well as the 64Kbyte user RAM as standard, and this micro cache can be expanded up to 192Kbyte. It speeds up disc operation, by holding files in RAM rather than requiring repeated disc accesses.

The Teac disc drives have been adapted, with intelligence added, so they automatically sense the presence of discs in the drive. When a planned 8086 add-on board giving 16-bit operation comes along in September, there will be auto sensing of 8-bit or 16-bit programs.

Micro News is compiled by Robert Parry

## Torch sues Tandon for faulty drives

by John Kavanagh

WILCOX Computers, the Wrexham-based company that is owned by the Welsh Development Agency, is negotiating a licence to manufacture the US-designed Saga Systems PBS-800 microcomputer.

Discussion have been going on for around six weeks, but a business plan has not yet been drawn up.

Wilcox will get assistance from Saga, including market studies. Initially all components will be imported, while Wilcox will then go into sourcing everything itself, apart from the board.

Saga Systems, based in Fremont, California, was set up two years ago. It is a marketing organisation, rather than a computer vendor. Its main activity involved setting up joint ventures with manufacturers in various countries.

The deal involves training for the "start-up" team, service training, sales and product training if required, advertising support, technical updates and central materials procurement.

Apart from the deal with Wilcox, Saga has joint ventures going in Saudi Arabia, Australia, India and Mexico.

Saga has taken an unusual approach in designing the PBS-800 for the international market. Bill Fisher, vice-president of Saga, explains that this is because the company's seven co-founders have an average of 15 years each in international business and know the market.

"We all had experience in working internationally and found we were always apologising because we had to explain what the problem of forged signatures or stolen cheques is serious and warrant procedures for dealing with it," says Fisher.

But, as with everything else, it is going to be careful not to improve rather than just to capitalise on what it already has. The market in the US is so strong that all other markets are treated as secondary.

Central to Stout's plan is the company's future in the US. The PBS-800 is the company's first product and is a much bigger and more developed US marketing base than either of the two companies that have joined together to form the new company.

Stout now reckons that both the financial level and the market outside the US. To address these markets the PBS-800 has been designed to avoid any regional and metro offices he is creating across the US.

Not that Stout has neglected the UK, rather the contrary. The UK, as it was in the Lundy days, is to be the worldwide market which is being undertaken by Portico by Askew.

So far this has led to a central to continental Europe.

Although the machine will be manufactured in many parts of the world, where it scored substantial success in the early seventies with its fast document reader and low and generally outperformed more impressive page readers.

## Welsh to make US micro

to source components wherever they chose, but they will have to satisfy Saga that the specification is exact and freely available.

The outstanding feature of the machine is its language capabilities, making it readily adaptable to local markets. By interchanging programs and a tool kit including such things as screwdrivers so that minor faults can be quickly repaired.

Saga does not want to go faster than it can manage. "We are prepared to see people put off by waiting lists," says Fisher.

Some drives had circuit boards and even heads missing, he adds.

"We're suing for lost business,

lost reputation and costs," says Vilbrand Boddy. "Our costs have been astronomical: we've had to send engineers to user sites in places like Canada."

Tandon attempted to rectify the problems, but later shipments were still faulty, so Torch cancelled the contract. Since then it has used drives from several other suppliers without problems.

In last week's news of GEC's purchase of 76% of Torch, the price GEC paid was inflated by a misplaced decimal point. GEC bought out the original backers for £3.25 million, not £32.5 million.

The Microsystem ECL 3211, based on a Digital Equipment PDP-11, using DEC terminals and storage devices, supports in-circuit emulations for 8, 16 and 32-bit designs.

Say Microsystem Services managing director, Jim Knott: "The ECL 3211 emulates in software with great flexibility and speed."

The price is between £12,000 and £25,000 per development station.

George McKenna, Microsystem's

## Microsystem to emulate

by John Riley

MICROSYSTEM Services, High Wycombe-based supplier of PROM programmers, is to distribute US-based Emulogic's microcomputer development system.

The Emulogic ECL 3211, based on a Digital Equipment PDP-11, using DEC terminals and storage devices, supports in-circuit emulations for 8, 16 and 32-bit designs.

Say Microsystem Services managing director, Jim Knott: "The ECL 3211 emulates in software with great flexibility and speed."

The price is between £12,000 and £25,000 per development station.

George McKenna, Emulogic's

president, claims that the system can support new chips in three to six months, compared with the average of 12 to 18 months in the industry. "We've designed everything in the emulation boards," he says, "and just need to redesign the pods."

The Teac disc drives have been adapted, with intelligence added, so they automatically sense the presence of discs in the drive.

When a planned 8086 add-on board giving 16-bit operation comes along in September, there will be auto sensing of 8-bit or 16-bit programs.

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## COMPANY NEWS

# Brokers love the Micro Focus mix

UNIVERSAL and total caution, mixed with profits that were roughly double those anticipated, was indeed a heady brew, and the brokers loved it.

That was how Brian Reynolds, the chairman of one of the most successful computer industry companies, went public about 10 weeks ago and attracted some of the best money in the City.

Reynolds' company, Micro Focus, went public about 10 weeks ago and attracted some of the best money in the City.

That money in pursuit of the shares available has driven the value of each Micro Focus share to a recent high of £4.20, from the tender price of £1.35.

The values Brian Reynolds' shareholding at slightly over £12 million, which is still only two-thirds of what he will be worth if the shares continue on to the £7 which some brokers predict.

The basis for the optimism last week was the half yearly results, which showed Micro Focus with turnover for the half year ended May 31 at £3,608,000. The turnover for the whole of the previous year was £4.45 million.

Profits at £747,000 were similarly close to the full year, which showed £854,000.

Despite a warning from Reynolds that parts of the explanation for the very good profits were a clamp on the growth of expenditure prior to the share sale in May and a big shift in the result of sales into the third quarter, brokers continue to expect million pound plus profits and doubled sales on last year in the full year results.

Despite the relief of a cash store, Reynolds warned that it would not last that long.

He said that about £1 million to £1.5 million was committed for spending before the year end.

"We will want to come back to the market (for more money) maybe by the end of the year and a rights issue."

REYNOLDS . . . Voices contains palpable relief.



## Inmos is all set for a Dram rise

LAST year American suppliers of 64Kbyte Dynamic RAM memories, the current staple memory of the microcomputer market and key product from Inmos, lost a collective \$125 million.

This year, as the recovery continues in general economic trends, demand has enabled the Japanese, who are estimated to hold about 70% of the worldwide market in 64Kbyte Drams, to show prices up from \$3.50 to \$6.

This same demand will enable Inmos to follow suit, increasing production and selling its products to a range of other semiconductor manufacturers.

The company is currently in the middle of the key ramp up into volume production of its 16Kbyte and 64Kbyte Dram.

While Inmos benefits directly from the change in the fortunes of the semiconductor market, many of the US-based producers have been caught short of production, having failed to invest during the recession.

This shortage, allied with the rise in price and demand, has created an opportunity for the UK government, looking for US investment to nudge the City of

London into putting up prices.

But there are some drawbacks little further down the line.

The experience of losses has persuaded a number of American memory chip producers to re-think their lines for a quick switch to the next generation of semiconductors, the 256Kbyte chip.

Leading the way, with prototype production now commenced, is an ex-team of Inmos designers, working at Micron in Boise, Idaho.

Samples have already been dispatched to various potential users and Micron has licensed the product to a range of other semiconductor manufacturers.

The company is currently in the middle of the key ramp up into volume production of its 16Kbyte and 64Kbyte Dram.

The biggest semiconductor giant of all, Western Electric, is already supplying volume 256Kbyte products to its own units.

And four major Japanese semiconductor giants, Fujitsu, Hitachi, Oki and Mitsubishi, are already supplying volume production of 256Kbyte chips to selected customers.

A whole array of US companies, including Motorola, Intel and National Semiconductor, are poised to deliver by the year-end.

BRITISH Telecom has hedged its bets in splitting probably the largest ever British purchase of financial packaged software between two suppliers.

MSA has supplied the package to BT in the past to run under the DOS operating system. BT also evaluated ICL's Lasa and Package Programs' MMS, written by General Electric's Software International subsidiary, before making its choice.

Ken Trueman, director of RTZ Computer Services which distributes MSA and Dodge products in the country, said: "It probably makes a lot of commercial sense for BT to go 50/50 between two vendors."

## SOFTWARE FILE

### University's ship system goes on sale

MAINE engineers at Strathclyde University are selling their Product cost package on the open market to aid in ship and oil platform design.

The program simplifies cost analysis for the production of ships and other offshore construction by assessing production costs, taking into account design changes, wage scales and production facilities.

## Suppliers share £1m BT order

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TRUEMAN . . . It's commercial sense for BT to go 50/50 between two vendors.

## Downloading could replace retailers - US report

TELEDISTRIBUTION - the downloading of software from one machine to another - could replace retailing, according to a new American report\*. Teledelivery by suppliers to retailers will be a short-lived phase, it predicts, but while it lasts it will relieve software up-sellers of their inventory burden. The retailers' distribution empire will start to crumble as high-speed data transmission direct to consumers becomes feasible.

First overtures are now being made by US software suppliers to retailers about tele-delivery to local distribution centres. They believe there could be big profits for both parties in cutting out the manufacture and distribution of floppy discs.

But there are obstacles to the plan, especially how to prevent illegal copying.

\* Downloading and tele-delivery of computer software, games, music and video, from International Resource Development Inc, 30 High Street, Norwalk, Connecticut, CT 06851, USA, 217 pages, price \$1,850.

## A new star is born



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COMING SOON.

## Safe fancies the USM

LOOK out for a new entrant to the Unlisted Securities Market as Safe Computing moves further into profit, as predicted in Computer Weekly a few weeks ago.

Safe, which emerged from corporate ownership by Chubb last year by way of a management buy-out by chairman Philip Rule, turned in profits for the year ended March 31, 1983 of £410,367 gross, which, after tax, and other charges, comes to £279,171 net.

This compares with a loss in the previous year.

Rule also revealed the turnover of the reorganised company was respectable £3,015,389.

According to Rule, the trade turnover growth and improved profits had continued into the first quarter of the current year.

This will be good news to Rule's backer, City of London investment institution United Computer and Technology Holding (UCA) which funded 21% of Rule's cash from the Chubb fold.

Company News is compiled by Kevin Cahill

## SHARES TABLE

The shares table, which is specially compiled for Computer Weekly, shows selected computer companies that reflect the state of the computer industry.

Date 18/7/83 Index 158.11 Change -10

Price	London Stock Exchange	Price	1983	S	US Stock	Price	Chg
High	Block	Price	C/kg	High	Low	Stock	Chg
180	Act (Pulsar) Ltd (25p)	910	-10	29	10.4	Amdahl	+10
181	Act (Pulsar) Ltd (25p)	910	-10	29	10.4	Amoco	+10
182	Act (Pulsar) Ltd (25p)	910	-10	29	10.4	Amoco	+10
183	Act (Pulsar) Ltd (25p)	910	-10	29	10.4	Amoco	+10
184	Act (Pulsar) Ltd (25p)	910	-10	29	10.4	Amoco	+10
185	Act (Pulsar) Ltd (25p)	910	-10	29	10.4	Amoco	+10
186	Act (Pulsar) Ltd (25p)	910	-10	29	10.4	Amoco	+10
187	Act (Pulsar) Ltd (25p)	910	-10	29	10.4	Amoco	+10
188	Act (Pulsar) Ltd (25p)	910	-10	29	10.4	Amoco	+10
189	Act (Pulsar) Ltd (25p)	910	-10	29	10.4	Amoco	+10
190	Act (Pulsar) Ltd (25p)	910	-10	29	10.4	Amoco	+10
191	Act (Pulsar) Ltd (25p)	910	-10	29	10.4	Amoco	+10
192	Act (Pulsar) Ltd (25p)	910	-10	29	10.4	Amoco	+10
193	Act (Pulsar) Ltd (25p)	910	-10	29	10.4	Amoco	+10
194	Act (Pulsar) Ltd (25p)	910	-10	29	10.4	Amoco	+10
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197	Act (Pulsar) Ltd (25p)	910	-10	29	10.4	Amoco	+10
198	Act (Pulsar) Ltd (25p)	910	-10	29	10.4	Amoco	+10
199	Act (Pulsar) Ltd (25p)	910	-10	29	10.4	Amoco	+10
200	Act (Pulsar) Ltd (25p)	910	-10	29	10.4	Amoco	+10
201	Act (Pulsar) Ltd (25p)	910	-10	29	10.4	Amoco	+10
202	Act (Pulsar) Ltd (25p)	910	-10	29	10.4	Amoco	+10
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220	Act (Pulsar) Ltd (25p)	910	-10	29	10.4	Amoco	+10
221	Act (Pulsar) Ltd (25p)	910	-10	29	10.4	Amoco	+10
222	Act (Pulsar) Ltd (25p)	910	-10	29	10.4		

# A touch of the East comes to Livingston

Kevin Cahill writes about Silicon Glen's latest arrival

NEC Corporation, as well as being one of Japan's biggest computer companies, is now a significant part of the UK high tech scene.

Beginning with the opening by the Queen of a semiconductor plant in Livingston, Scotland, that is about 20% bigger than the famous plant in Wales, the company has ambitious plans for further investment, as well as for a larger share of the UK micro and telecommunications market.

Talks about new plant will follow a report being made by the NEC chairman, Dr Koji Kobayashi, direct to the Prime Minister.

In the meantime to ensure that the market gets the message Kobayashi has launched the Advanced Personal Computer, an MS/DOS running 8086 based 16-bit personal micro at an entry level price of £1,950.

This price aggression marks a sharp change of marketing strategy for NEC at the lower end of the market place, a change that has come at some cost to the company.

About 18 months ago NEC introduced its best selling PC 8000 eight bit micro to the UK via the medium of an exclusive marketing deal with an English distribution company.

That deal fell apart, and what ever may have happened between NEC and its distributor, from the

outside there were three all too evident weaknesses in the operation.

The first is that the PC 8000 is neither CP/M, nor Apple compatible. The world of software which has made the PC 8000 one of Japan's best selling personal micros, and which has given NEC 45% of the Japanese personal

well software, has a full range of peripherals and is roughly £1,000 less than the IBM PC.

The launch of the APC has taken place against the background of a rapidly expanding dealer network, now 37, and expected to reach 100 by Christmas.

In addition the NEC staff, led by personal computer department

Perhaps it is a mark of NEC, and it's certainly a hallmark of its chairman, that the company can look failure in the face, learn from it and come back fighting

micro market, was absent in the UK.

The marketing company representing NEC then failed to develop either a large or widely distributed dealer network and, finally, the price of the PC 8000 to the potential dealer network was simply not profitable enough to attract the widespread shelf display that a successful personal computer must have.

Perhaps it is a mark of NEC, and it's certainly a hallmark of its chairman, that the company can look failure in the face, learn from it and come back fighting.

This NEC has done.

The 16-bit APC is attractive,

manager Mike Flashman, have forged three key deals with major shop chains.

The first deal is with the John Lewis chain, the second is with Tesco and the third is with the Steiger group.

There are three more big deals on the way and there is an interesting angle for what we are going to see in our high street stores contained in a remark by Flashman.

Answering a question about whether he thought that the high street stores had the competence to sell the APC, Flashman said that he had seldom seen so much effort, money and determination go into anything as was going into the high

street micro marketing endeavour.

While the most visible aspect of NEC will probably be its retail marketing effort, much more will be coming to Britain than Japanese built micros.

Kobayashi has a favourite story, as opposed to the reminiscences about his first visit to Britain in 1938, which he likes to tell in Japan.

In addition the NEC staff, led by personal computer department



KOBAYASHI . . . Wanted digitalisation in the 1960s.

ambitious mainframe startup ever attempted, that currently underway at Trilogy Corporation.

To Kobayashi's generation all success has arisen despite the devastation of the second world war, and despite language barriers and the real, overwhelming technological might of the US.

While NEC is a very successful supplier of computers in its home market of Japan, this is one area in which the company has not had the same success overseas as it has had in almost every other field.

The Acos mainframe series was developed originally from a partnership with Honeywell, and has led to the development of what NEC claims is the world's fastest and largest serial processor.

Until last October there were two supercomputer manufacturers in the world, CDC and Cray Research, both American.

Suddenly last autumn, there

"The only place the invincible Japanese juggernaut exists is in the minds of non-competitive American suppliers."

were six supercomputer companies, three of them Japanese, and one of those was NEC, which offered a 600 MIPS vector processor for delivery in 1985.

While the sudden appearance of the Japanese vendors took the world by surprise, there was plenty of warning that such a development was inevitable.

NEC, alongside Fujitsu and Hitachi, the other two vendors in the field, is deeply involved in the creation of the Fifth Generation Machines.

The issue of IBM compatibility, where NEC remains alone among Japan's big four mainframe builders in not having taken any overt steps to go compatible has been widely raised in Japan.

NEC belongs to a grouping of Japanese companies gathered around the Sumitomo banking organisation.

While the real jumps in supercomputer power have all so far come from the brain and hand of one man, Dr Seymour Cray, the principles of the operation and how to build such machines are

## EAST-WEST TRADE

Charles Christian argues for more clearly defined international rules on technological exports to Communist lands

# The muddled thinking behind the Cold War exports ban

THE NEWS that UK customs authorities are instituting a "clamp down" on the smuggling and illegal export of "sensitive" high technology products to Eastern Bloc countries has served to remind us all that there are other weapons in the Cold War strategist's armoury besides Cruise and Trident.

Either the goods that are sought to be exported are on the export licensing branch's "prohibited list", which means that they may not be exported under any circumstances to anywhere in the world. Or, they are goods which may only be exported on an "export licence".

Factors that will be taken into account by the Department of Trade when considering whether or not to grant an export licence will usually include the nature of the goods - certain chemicals, atomic energy materials and military equipment are always vetted - as well as the country to which they are bound.

So much for the theory, and bearing in mind the amount of government controls and red tape that nowadays surround the running of any business enterprise, you would think that the relevant authorities would be able to enforce their export embargoes.

To some extent this is true, and increased co-operation between customs and security agencies around the world is helping to cut down the amount of blatantly criminal smuggling, particularly of weapons and war materials, that goes on. But there remains the very grave problem of illegal exporting, whereby products restricted by COCOM are still managed to find their way into the hordes of Islam at bay for almost a millennium thanks to their secret weapon of "Greek Fire".

And far to the East, for many years of Imperial China's most carefully protected military secrets was the location of the breeding grounds of their powerful horses.

As an aside, perhaps reflecting the so-called inscrutability of the Oriental mind, it is interesting to note that the Chinese also possessed gunpowder, which they did not bother protecting as they only used it for filling decorative fireworks, although they went to extreme lengths to protect the secret of how they made silk.

Over the years the trade embargo on the export of strategic secrets and technology has continued to employ an important role in world affairs, right down to the mundane realities of the present day. One of the most recent incidents was the discovery and seizure of two DEC PDP-11s at Dover docks bound for Moscow via Amsterdam under the innocent guise of mere "typesetting equipment".

And then there is the question of just how far down the line do you go? It is one thing to prevent the export of completed products that everybody should be able to ascertain just what sort of activities are permissible and which are not.

But where do you draw the line with the type of technology COCOM has in mind?

First, there is the problem of "definition", for it is an essential characteristic of any legal system that everybody should be able to ascertain just what sort of activities are permissible and which are not. But where do you draw the line with the type of technology COCOM has in mind?

The result is uncertainty, with the only people to suffer being innocent Western intermediaries.

At least one UK systems house has recently gone into liquidation

partly because of the cash-flow problem that arose due to its failure to obtain further shipments of computers from the US for export to Eastern Europe, although it had already obtained the necessary UK export licence clearances.

If you accept this argument then logic would indicate that the US should bring their shipments of grain to the USSR under the COCOM provisions, as there is a very large traffic really is.

The obvious difficulty here is that the Russians do not allow any one into their production plants, so it is impossible to find out how much Western kit they have obtained. Similarly, if a Western company is involved in illegal exporting, it is unlikely that their files will contain formal orders written on Kremlin paper.

Most illegal exports involve circuitous transport routes with goods reaching the USSR from the US via the UK, Holland, Spain, Turkey, Austria and then on through Poland, Romania or Bulgaria.

The identity of the goods may change during transit - thus the DEC minicomputers at Dover had miraculously turned into typesetting equipment - and it is not unusual for the equipment's physical nature to be cosmetically altered by a new coat of paint and perhaps some different serial numbers, for which, of course, the appropriate documentation has not been "obtained".

Further confusion and covering of tracks can be caused by the fact

that the original vendors and possibly even their customers will be totally unaware of the clandestine motives behind subsequent transactions and so be acting completely innocently.

If the culprits are found, the law does not provide much in the way of penalties. The financial rewards - often paid in tax-free cash into Swiss bank accounts - and the punishments handed out are unlikely to deter anyone.

But supplies of such equipment for their business. Once again the measures could hurt the innocent just as much as the guilty.

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What happens if you are caught selling off a half-a-dozen minicomputers to the Russians, thereby enabling them to get their hands on 16- and 32-bit hardware architecture? Assuming the Department of Trade could find enough evidence against you, the most that is likely to happen is that you will be charged with the technical offence of exporting goods without a licence and given a paltry fine.

The last time the Department, in conjunction with the Foreign Office, tried to use a trade embargo as a major instrument of international policy, was in 1965 when Harold Wilson's Government threatened to topple "by Christmas" Ian Smith's regime in Rhodesia which had just declared UDI. Even when backed up by the full force of UN sanctions there was no stopping the flood of illegal exports to that country and only a handful of prosecutions were ever brought.

The COCOM system then is likely to remain for as long as the Cold War with the Eastern Bloc continues. It is a good idea in theory, but in practice it is a mess. It is riddled with uncertainties, it is virtually impossible to catch the guilty parties, the penalties are insufficient to deter anyone, and in far too many instances it seems that the only people who get hurt are the innocent. If the UK government is to continue to support COCOM, many believe it must make its reform a number one priority.

"The financial rewards of illegal exporting can be massive - often paid tax-free into Swiss bank accounts and the punishments handed out are unlikely to deter anyone."

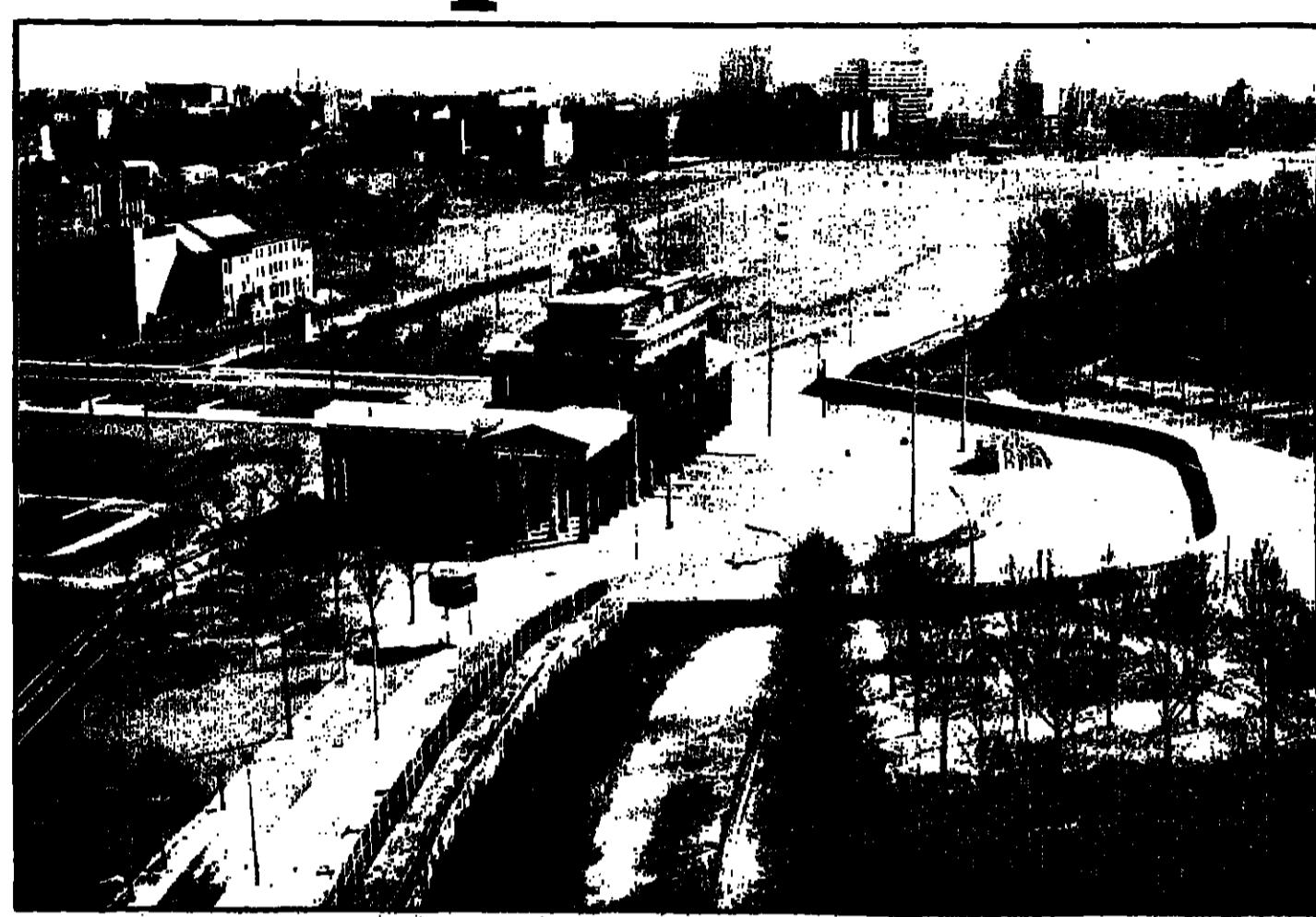
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dealing and manoeuvres. Add to this the fact that there is no such thing as an international police force and that the authorities, certainly in Russia, would never co-operate with any investigation, and it is not surprising that it is only luck that anyone gets caught.

The COCOM regulations could be tightened up to an extent that all potentially dangerous US hardware would never leave North America. That would certainly make it difficult for smugglers to use the UK or Western Europe as a stepping-stone to Warsaw Pact countries but it would also hit legitimate business interests, whether US manufacturers needing export orders to remain profitable, or UK systems houses dependent on regu-

latory confusion and covering of tracks can be caused by the fact



BERLIN WALL . . . Symbol of the Cold War in which computer technology is increasingly important.



DOVER DOCKS . . . Scene of the seizure of computers bound for Moscow.

Charles Christian is a freelance journalist.

**PLATFORM***Hannah Rose is an independent columnist.*

Does the privacy Bill really get the balance right?

**PROFILE**

# Mid-Atlantic manager who puts agility at a premium

PAUL BAILEY, Digital Research's director of European operations, is the archetypal mid-Atlantic man. This is partly because he has joined the small club of young, fourth-generation computer executives whose rule-of-thumb program reads: "If day equals Tuesday, place equals California." And it is partly that most of his life has been a bit like that anyway.

Rowley's efforts have already paid off, with Digital expanding to 350 staff and income at the end of the year on July 31 up from \$1 million to around \$40 million.

"Those figures tell you a lot

about what has happened in Digital. Up to income of \$8 million you can still be pretty loose. After that you start to get into problems of organisation and balance."

Now the firm has six US offices

and branches in Britain, West Germany and Japan.

The legislation is essentially the same as before, although the government has taken the opportunity to deal with some of the points raised in debates earlier this year on the original bill. The general direction of the changes can be assessed from the reactions of various speakers in the debate.

Lord Mottistone, who was assiduous in presenting the case of the CBI (as well as sometimes contradictory ideas from others), unreservedly welcomed the "improvements", felt that "the main body

"We now have a chance to put right things which are grossly wrong. I hope that we shall fight to the last minute of the last hour to do so"

This is not to say that all the changes have been in one direction. A general duty has been placed on the Registrar "so to perform his function as to promote the observance of the data protection principles"; the courts will now be able to order the rectification of inaccurate data even if no damage has been caused to a data subject; and the Data Protection Tribunal (to which data users will be able to appeal against decisions of the Registrar) will expressly include "persons to represent the interests of data subjects".

On balance, it is clear why opposition peers were frustrated and Lord Mottistone was satisfied. As Lord Mischnon, winding up the debate put it "every amendment that was suggested by the CBI and was accepted meant that, from the point of view of the noble Lord, this was now a very acceptable bill; whereas, of course, the fact that the government did not accept any one of the major amendments of the National Council for Civil Liberties also meant that it must be a very good bill and that no further discussion was necessary".

He believed "that we have already fought the main battles and that we should view this occasion as the time when those battles have been fought. It would be slightly tedious for the House to go over ground that we have already covered."

Labour, Liberal and Social Democratic peers regretted that the government had made no concessions whatsoever on the issues which they had previously raised - for example, the scope of exemptions, the potential pressures upon those who hold data to breach confidentiality in certain circumstances, the absence of any advisory committee and any provision for even voluntary codes of practice to be recognised.

They disagreed "in the vehemence yet polite manner of Lords" with Lord Mottistone. As Lord Donaldson of Kingsbridge said: "The point is that we now have a chance to put right things which are grossly wrong. I hope that we shall fight to the last minute of the last hour to do so . . . because they are fundamental to civil liberties everywhere."

Whatever the rhetoric, there can be little doubt that the government will, following the election, be a little inclined to accept amendments on matters of principle from the opposition as it was before.

Hannah Rose



BAILEY . . . "It's no good analysing problems to death."

wants to check if everyone else seems the pace that easy he should ask his receptionist.

Bailey is one of a little group of Tektronix people who migrated to Digital recently. Chief among them was John Rowley who was responsible for persuading him to follow.

"I didn't know much about Digital though the name CP/M seemed to be everywhere. I went over to Pacific Grove, Monterey, and found a lot of enthusiasm there. There seemed to be a lot of activity late in the evening, though

Rowley is now company president and founder Gary Kildall has moved aside to concentrate on research.

there was also a lack of professionalism in some areas."

The success of the CP/M family of operating systems on 8-bit micros had given Digital an \$8 million revenue and a staff of 120.

Rowley believed, and quickly convinced Bailey, that Digital should stop being locked into the West Coast of America and get itself dispersed as an international organisation.

"I prefer an open environment, where you can see results quickly. It's no good analysing problems to death. If you're that, the competition will top your product and it won't matter anyway."

**DOWNTIME**

## Nice one, er, David

PERHAPS the most salient feature of Paradyne's new UK management team is that they are all called David.

There's David Hobin, the managing director, who came from the parent company in Florida; David Crofts, the vice-president for Europe and ex-Honeywell; David Spicer, the director for business development in Europe; and David Houston, the director for product marketing.

At first glance, this seems to be acceptable, if not highly satisfactory, to the computing industry. But, if the legislation does not work or if it comes to be widely seen as defending data rather than defending people from the misuse of data, it could be counterproductive. Worse still, the exemptions given by the government to itself and to industry could increase public distrust of "Big Brother" - and identify computing as an integral part of what is feared.

Concern for civil liberties is a matter of individual political commitment, not one for the computing industry, or its members as such. They, however, must be concerned that legislation gets the balance right so as to increase public confidence in computing as a social, as well as a commercial, benefit. It remains doubtful whether the bill strikes the right balance.

But, so far, the four war-

hardened heroes have not been named.

Oakley maintains that the nice-nes of protocol must be observed, and that any announcement must come from the DoI.

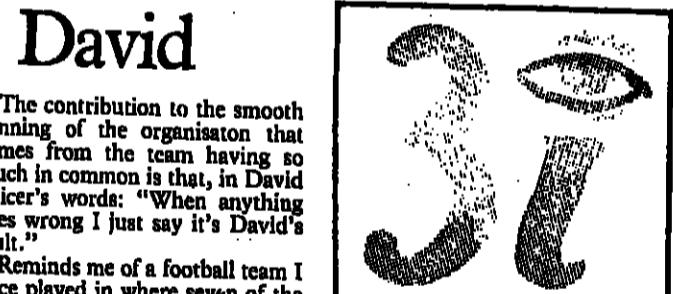
But surely the companies from which the task force has been recruited know they've left, if only because their desks are empty?

They were returning from the massage parlour, he spied a lady poring

over a copy of this journal. Not much new there, you might think, intelligent persons everywhere hang on our every word.

Well, she wasn't actually poring over it, more sort of pouring vinegar over her fish and chips which were contained within. We always knew that we were absorbing.

Currently, the number of accountants can be held in one bit.



## Eternal students

I KNOW the trend these days is to stay at university until one is safely past retiring age, but I wasn't aware that the nationalised industries are already geared up for such an eventuality.

The data capture machines used by British Rail for traffic surveys lump Young Person's, Students and Senior Citizens' railcards together under the heading "Student Railcard".

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## One in the eye

SEEING the sparkling new logo for the renamed investor firm Finance for Industry - which now goes under the name Investors in Industry, or 3i - I felt the gathering of dim memories of my classical education.

It was the conjunction of the figure three and the eye that formed the dot of the 'i' that did it. Then it came to me.

The Graiae - those half-sisters of the gorgons who told Perseus the way to the gorgons' lair so he could lop off Medusa's head - had only one eye between them. And only one tooth.

Then Perseus turns up, he grabs the eye and threatens to take the tooth, too - unless the Graiae come across with the info. They do, and he gives them back the eye and files off.

But there the resemblance ends. The successful 3i can be nothing like the blind and toothless triplets held to ransom by the man that helped, can it?

The computer industry has developed as quickly as it has through the uninhibited flow of technical information. The government must be clear about what it is doing before it quietly clears the decks to come to an agreement with the Reagan Administrations ideas on the control of trade with Communist countries.

EEC should unite

IT is 26 years since the signing of the Treaty of Rome, once hailed as a brilliant effort to get Europe to work together.

Putting aside the failures in cooperation in the traditional industries, a recent report for the European Parliament has highlighted the results of a failure of cooperation in the newest, information technology.

Japan, with an expenditure of only £250 million, has become a major power in the field of microprocessors and has captured 40% of the world market. Western Europe has spent twice as much to gain only 10% of this market.

It is a problem that the European Commission has addressed with the Esprit programme, but it is not yet clear whether this will gain the support and long term commitment that is necessary to make it a success.

It is to be hoped that the Commission and the member

states will pull together this time and obtain better value for money than it has in the past 15 years.

**1984 and all that . . .**

THIS week's example of the strange things people say about computers was sent in by Jackie Burke of London, who wins £5. One final word of caution: it is the software that makes your hardware jump through hoops. You may have just invested an arm or leg in computer equipment, but without the software, Micro-Calc hasn't got off the ground.

*Rolling Stone*

## Chips are in the news again

MY colleague, correspondent informing me of *Computer Weekly's* growing popularity with the denizens of that fair city, renowned for, er, um, costing £3.60 a first class from Victoria.

Only the other evening, as he was returning from the massage parlour, he spied a lady poring

over a copy of this journal. Not much new there, you might think, intelligent persons everywhere hang on our every word.

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LiveWare File

by Don



# ComputerWeekly

Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS

Thursday, July 21, 1983

## LETTERS

### Do take your time

IN A letter which you published about British Telecom plans for on-line directory enquiries (*Computer Weekly*, June 30), R. J. Hewitt of High-Tech Computer Systems, Nottingham, wondered about the "mathematical qualifications" of your writer, Andrew Thomas.

He then went on to postulate that "reducing the average call by 12 seconds means that the next call is answered 12 seconds sooner. This is equivalent to a 30% reduction in waiting for a call to be answered, while the staff reduction is only 25%".

In spite of my lack of "mathematical qualifications", I hope that Mr Hewitt will permit me to show that a rather less favourable outcome can be calculated.

If we assume that the queuing theory of Khinchine and Pollaczek applies, with random arrival times and service times, and we assume that the maximum number of operators on duty at any time is 53.3% of the total complement, presently 10,000 (Andrew Thomas' article, May 19, states plans for 4,000 terminals and 7,500 staff), then the maximum theoretical number of calls which could be presently answered per minute is:

$$53.3 \times 10,000 \times \frac{60}{60 - 0.62} = 6,150$$

(with infinite queues for service).

If the number of operators is reduced to 7,500, and the average handling time is reduced from 52 seconds to 40 seconds, then

$$\frac{60}{60 - 0.62} = 0.992$$

or a wait of 0.992 \times 40 = 39.7 seconds.

The reduction in waiting time is therefore 9.7 seconds (19.6%) and the 12 seconds (30%) which

Mr Hewitt postulated.

Perhaps other readers, with

"mathematical qualifications" even,

would care to utilise this or other queuing theory formulae to calculate the most advantageous balance between staff reductions and service improvement levels.

STANLEY MACKINTOSH

Mackintosh Mackintosh

Johnstone & Partners

Management Consultants

Harrogate HG3 1QL.

It is already an offence under the Official Secrets Act - one which can rise to the gravity of treason - to supply official information or other information that could be useful to an enemy or potential enemy.

Why then does the government need to further control information of an as yet unspecified technical nature? We hope that MP's will ask the government both the why and the what of the control that it intends to establish next month.

It is probably too much to hope that the government should also explain how it intends to control this information. For, despite the high hopes of the computer industry it is unlikely that many more than a score of members of the Lords or Commons have more than the most elementary grasp of the nature of information technology - even after IT82.

Which civil servants will determine which information must travel only in sealed envelopes or by means of unbreakable codes from that which can be published freely in academic journals and newspapers which are freely available in our society to members of the Soviet diplomatic corps?

Not only would the organisers and police be able to check departures and drop-outs for forward advice to the finish, but critically sited checkpoints would be able to assess the build-up of traffic at bottlenecks and hold back riders until the peaks subsided.

Likewise British Rail would know when the rushes would occur.

So come on all you traffic modellers and rapid data capturers, let's see if you can crack this

**Focus on PC**

I NOTED with interest the article on ADR's plans to link the IBM PC and mainframe computers with comparable software (*Computer Weekly*, July 7).

Your readers may not be aware that Focus, the leading 4GL, is already available on the IBM PC and is being delivered to users.

PC/Focus has the identical syntax to mainframe Focus and thus can be used for: developing mainframe applications; stand alone PC applications; analysing data transferred from the mainframe to the PC; and sending data to the mainframe from the PC.

P. R. SCAWEN

Managing Director

Information Builders (UK)

Wembley HA9 6BB.

Dastardly plot

ON THE Imos secrecy business, if Dick Barton needs to be told (*Letters*, *Computer Weekly*, July 7) then what hope for us ordinary mortals?

I can only hope that the old team will be back together protecting us from what appears to be some dastardly plot to ruin the chances of us ever having a silicon industry.

What about some questions in the House?

PETER MINTON

Whitchurch

Reading



Milton Keynes is the location for Europe's first Energy Park.

## CONSULTANTS CASEBOOK

SYSTEMS planning studies can be fraught with hidden difficulties and pitfalls. The failure of an over-ambitious information systems plan can be disastrous, both to the data processing department involved and the company which it serves.

We were called in by the chief executive of a multinational electrical goods company, following the collapse and cancellation of its five-year DP plan. The chief executive acted as chairman of the company's Information Systems Control Group, which had been set up to monitor and control major new computer and systems developments.

Work on the five-year strategy had been cancelled less than a year after the start of development work.

This was the result of rapidly escalating cost estimates on almost every aspect of the development process, coupled with a lack of tangible results in management's eyes, and dwindling commitment to the benefits originally foreseen.

Needless to say, the DP function was in complete disarray and confusion. Morale had sunk to a low ebb, with everyone looking over his shoulder expecting the axe.

The cost of cancellation had so far been calculated at more than £400,000, made up of the costs of buying several major software packages and the wasted manpower effort to date.

As for the company's management, it was thoroughly disenchanted with the entire process of computer system development and was wondering where on earth it had gone wrong.

It was still, however, committed to changing and extending the present system set up. But not at any cost!

The company was the European arm of a Canadian giant, which had been operating in Europe for the past 25 years and was allowed

The company believed that the two-year payout would represent a fair investment

considerable freedom by its parent.

The company agreed cash flow, revenue, profit and investment targets with Canadian management, and was thereafter permitted to run an operation to suit local European conditions and markets.

It had extensive manufacturing and marketing networks throughout Europe, was headquartered in London and had become a profitable decentralised operation based in six countries.

However, the company had retained a central mainframe concept for each of the subsidiaries, as originally set up in the early 1960s. Each operation ran a medium-scale Burroughs mainframe, feeding and being fed, every month-end by the London HQ installation on a dial-up basis.

Over the years, a whole host of mind and micros had also grown up in each country. The costs of running and maintaining this

## Profit from fuel cuts in first Energy Park

by Philip Hunter

A RICH seam of opportunities for computer and communications companies will emerge later this year when work begins on Europe's first Energy Park in Milton Keynes.

The Park, which will include private houses, factories, warehouses, schools and community centres, will also provide attractive sites to makers and users of computers that use a lot of electricity.

The aim is to cut fuel bills for private houses and business premises by good thermal design of

buildings, and by management.

The Electricity Board will be involved in the project with computerised remote meter reading. By offering variable hourly charge rate based on rate of consumption, the board will, in theory, be able to control use of electricity to optimise both its own production and reduce customers' bills.

But planning director John Walker insists that private users will only have the Electricity Board on the phone telling them to turn off their fridges for an hour if they wish it.

Milton Keynes is also a test bed for local area networks.

Communications will also feature prominently in the project, and there will be links with the existing IT initiative in the town.

The Energy Park will be one of the first to be linked to the private Mercury Network aimed mainly at business users who want high speed communications.

Already 20,000 homes in Milton Keynes are served by British Telecom's coaxial cable network, and this will be extended to the new Energy Park.

Milton Keynes is also a test bed for local area networks.

## PUZZLER



IN the above diagram, separate points have been in such a way as to form lines-of-three.

This week's problem is two points only in such a way as to form lines-of-three instead.

See page 55 for the solution to the problem.

# THE AUTOMATED OFFICE

## The people who have made the office of the present

John Lamb on how the paperless office became the electronic office, the office of the future, then the automated office

FIRST there was the paperless office, then the electronic office, followed by the office of the future, and finally the automated office.

Over the past five years or so each annual round of conferences has brought a new buzzword for the precursor to some kind of management workstation. "We only invest when we have satisfied ourselves that there is a cost benefit to be gained from office automation," he said.

Despite the ever-changing catch-phrases, one would be hard put to find the kind of all-embracing "electrification" of white collar workers that the Joe Lyons company had in mind in the 50s when it chose to call its first computer system the Lyons Electronic Office.

This is puzzling, because back in the late seventies manufacturers like IBM, Wang, Prime and Sperry were for ever trumpeting some new system that combined electronic mail with word processing, tele and some kind of electronic file store.

Management, we said, expect to see tangible results from their investment within a month period.

An education and an

No one in the existing DP organisation was skilled in putting together or costing such a complex

programme would have to be signed for user management to ensure that the process of development, and the implementation of changes for the company, identified and understood.

Without this understanding, user management through the company, and without management from the lowest level of the organisation, the human drum stuff, as the argument went, and you gave the decision maker more thinking time to mull over those instantly available reports and company data.

Perhaps our most key recommendation concerned the existing function itself. It had to be upgraded with the necessary expertise to enable it to play a role both in the initial planning and resultant development of the management level down.

The company committed to lead the information management plan, the study took six months to perform that's another significant achievement, and you gave the decision maker more thinking time to mull over those instantly available reports and company data.

It has not quite turned out like that. In fact one can trace in the changing catch phrases a growing realisation that there was a lot more to office productivity than ringing up the floorboards and writing in a whole lot of terminals.

First there is no way that anyone is going to do away with paper. Cut it down perhaps, but not abolish it. Second, it is a brave manufacturer who proposed some all-encompassing office system, although there has been some resurgence of this idea with the arrival of local area networks.

Interestingly enough earlier notions that customers were going to buy all the gear to hang on these networks from a single source have been replaced by an emphasis on standards which enable users to mix and match.

The best phrase of all, perhaps, is office of the future, because implying this is exactly that: something for the future, rather than something that can be usefully employed now.

That is not to say that office automation has failed. It is proceeding space, but in piecemeal rather than a concerted fashion. What we have seen is individual elements of office automation finding a ready market, but few users prepared to bundle the lot up in a single system.

At BP, for instance, head office managers have an impressive information system which enables

them to keep up-to-date on operations in major BP companies.

But the man in charge of this Natural Resources System (NRS), is adamant that it is not necessarily the precursor to some kind of management workstation. "We only invest when we have satisfied ourselves that there is a cost benefit to be gained from office automation," he said.

One of the big stumbling blocks in the advance of office automation is this question of measuring its effectiveness. It is relatively easy to record the number of letters that a typist produces each day, or the cost of sending letters by post or special messengers. But it is more difficult to make a case for the benefits of improved information flow or the advantages of mailbox systems.

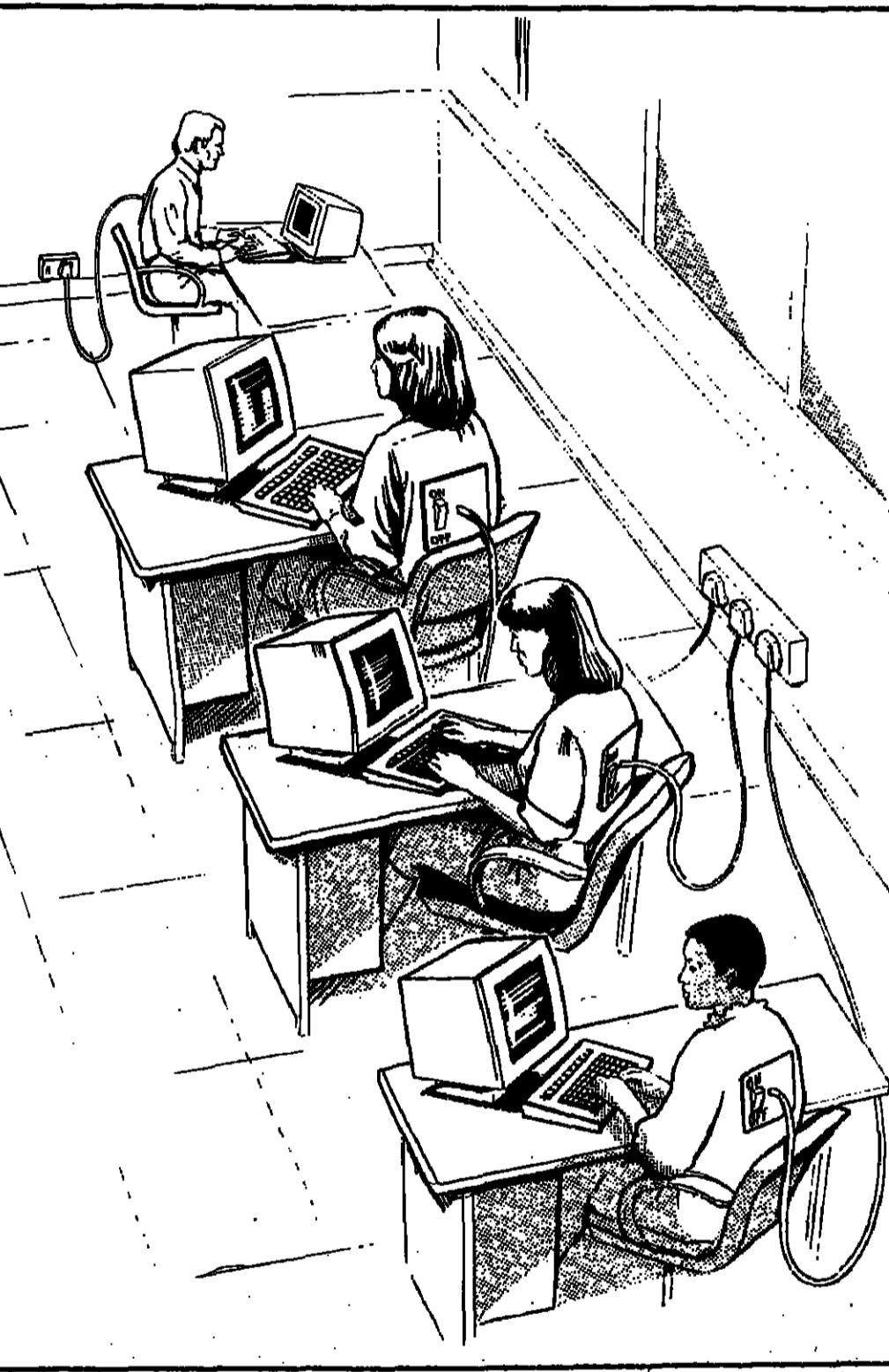
Such questions are not helped by the disagreements between manufacturers about the best way of doing things. The computer firms advocate local area networks with all the intelligence at the workstation or attached device, while communications firms say it should be in the PABX because this avoids rewiring.

Again, do users buy a personal computer for a specific job with the intention of upgrading it to fit in with some wider office automation scheme, or do they wait for a centrally organised scheme integrated with the company's larger computers?

In certain types of company, office automation has to be set against what could be called customer automation. In other words investing in systems which remove the need for office staff, because the customer does his own administration. The classic example is automated teller networks. No office staff are involved in these transactions.

These automated services are not just confined to the financial world. Travel agencies routinely book holidays and flights on the say so of a computer.

Much office automation has had little to do with large organisation anyway. The personal computer has been eagerly adopted by small businesses to speed up and improve clerical work. While the big boys have been scratching their heads over networks and ergonomics, their small cousins have been equipping themselves with the office of the present.



The electronic dream?



to help perform the necessary development tasks. They were amazed at the amount of time required of them in order that the systems developments might be undertaken.

The chief executive cancelled the company's five-year system plan, read the riot act to the world in general, and the DP function in particular. Gloom and despondency settled over the organisation. It had expected the existing DP management team to exercise control over very advanced system development areas, such as, perhaps, skills as it went along.

Annual benefits totalling £4 mil-

lion were to be made available to the company, but its

foreseen business climates and in line with the company's business objectives.

User management would have to participate on a full-time basis within the planning process. The new study team would report regularly to the group to ensure its remained in touch with senior management thinking. Any benefits identified by the process had to be signed off by the senior executive responsible for the functional area involved, and committed to the group.

We had serious doubts, that a

## THE AUTOMATED OFFICE

Integrated office automation sounds wonderful – but how does it work in practice? Martha Turinas describes it

# The system that is more than the sum of all its parts

**INTEGRATED OFFICE** automation is more than the sum of its parts – computing, telecommunications and information handling in various forms. For the supplier it is a completely new market; for the user it is a completely new experience.

The implementation record of the early integrated systems has shown that there can be big problems in converting the theoretical benefits of the equipment into everyday practice.

For both suppliers and users, integrated office automation is a far cry from the familiar practices of data processing and the use of conventional office equipment supply.

In data processing the environment is controlled and the well-specified tasks are handled by in-

coming from general consultancies or from the system supplier, where the supplying company's knowledge of its equipment plays an important role in maximising its effectiveness in use.

In approaching office automation, most user organisations will start with a pilot project of some type, with the general intention of gradually expanding its applications throughout the organisation. The pilot department or area should be chosen with care. It should be large enough to have the necessary "critical mass" to make electronic communications worthwhile, and it should have reasonably high visibility within the organisation.

Suitable candidates might be a marketing department or a personnel department, where much of the work is event-driven and unstructured and where there is a lot of communication.

Identifying suitable pilot project will normally be a part of the planning and feasibility assessment that precedes the acquisition of equipment. Other aspects of the introduction of the new system should also be covered at that stage, usually in conjunction with the supplier. But, all too often, while overall strategy may be clear, the many details involved in effective implementation are overlooked or left until later.

Education is one of the most crucial aspects. There is a tendency to assume that, after a short session of instruction on how to use the workstation, all will be well. It is general practice for users to be given, say, two days' training on the equipment and they are then expected to get back to work more or less as normal. This ignores the fact that what is involved is a totally new way of working.

Experience has shown that this applies to all sizes of organisation, from a small market research company, for example, to the head office of a major retail company. They are all learning that to introduce integrated office systems involves much more than simply replacing the old with the new and hoping for the best.

The introduction of an integrated system can involve some very basic thinking. It is feasible, for instance, for an organisation to automate the processing of forms using the new electronic system. The whole process of calculating, submitting, checking, approving and paying expense claims, as one example, could be handled easily by the system – but how would this affect existing authorisation procedures?

In other words, the user organisation must accept the responsibility for carefully assessing not simply whether the proposed new office system can do particular tasks, but, more importantly, whether the system should do them; and what procedural changes will have to be made to accomplish the task in the most practical way. If it seems an obvious point to make, these implications are often overlooked.

In terms of the use of the equipment, a common mistake is to fall control of the way the system is used – to adopt standard procedures for such things as testing and access to shared databases and other shared files. People tend to think that, as soon as they are linked to a computer, they have an electronic black hole in which they can store anything, and everything, without limit.

The confusion that can follow the proliferation of individual



For the user, integrated office automation involves more than just keyboards.

floppy discs is all too real.

The setting up an agreed "house style" for what is to be stored, and how, and for how long, and how appropriate access for authorised persons is to be determined and maintained is all very basic, very detailed – and very important for success.

Thus an integrated office system will bring new ways of working, plus many potential benefits, but there are many pitfalls to avoid, and a need to impose some structure on an essentially unstructured set of activities. Giving people the new workstations on their desks is not enough. Who will ensure that there is no conflict between individual needs and those of the organisation? Or that the consultant must work closely with the supervisor.

In general, the basic capabilities of an integrated system will be tailored by the user organisation to meet its own requirements, and the organisation will write its own procedures manual.

chosen but extending throughout the implementation phase. The consultant can provide assistance and guidance to in-house office automation teams in such areas as cost-justification, choice of pilot sites, and user involvement; planning and implementation, in-

cluding phasing, parallel running, layout and ergonomic aspects; training, including general seminars and tailored in-house briefings; and post-implementation "nursing" to ensure that the equipment is used to its full capacity.

In general, the basic capabilities of an integrated system will be tailored by the user organisation to meet its own requirements, and the organisation will write its own procedures manual. The consultant can develop guidelines to ensure that the organisation is putting in the procedures and controls and is educating the people who will use the system. To achieve this the consultant must work closely with the supervisor.

Arguably, in the long term, only those organisations which bring these three disciplines together under one person will succeed with an integrated system.

But the real key to success in implementing integrated office systems will lie in the choice of person for the detailed co-ordination

house experts in the technology. In office automation working methods are unstructured and everyone, from the managing director to the most junior clerk, may be asked to change the way they work and communicate.

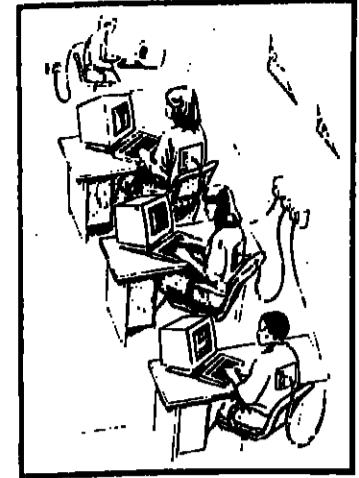
One problem may be in the wide range of facilities that are provided. In an integrated office system, users may have access to word processing, electronic mail, electronic filing and retrieval, administrative services (such as a personal directory, message recording, personal diary, calculation, meeting scheduling), personal computing, corporate data processing, voice messages, telecommunications, local office processing and outside databases.

Having all these facilities in a single desktop workstation is, of course, the key benefit which office automation offers. But it is not easy to design and implement a system which, guaranteed, success because the office environment is not controlled, and because different people will use their terminals in different ways, reacting to events, decisions and changing circumstances in the unpredictable pattern that typifies office work.

Hence the value to users of continued consultancy support as they strive to get the most out of their integrated systems. This support

## THE AUTOMATED OFFICE

Roger Winder describes what he believes is the central office automation denominator



# Word processing is the common office factor

**IF MARKET** surveys are to be believed, 98% of the companies in Europe will be running word processing applications by 1990, compared with 42% now. Word processing has proved itself the common denominator between different organisations moving towards office automation and, as such, is rapidly assuming a central role in development.

No longer is it a substitute for a typewriter and merely a means for producing blemish-free letters; we recommend dedicated word processing machines," said Jim Frankland, head of management services. "Where the balance lies in data manipulation we have recommended ICL DRS 20 micros."

The office of the future has to be designed with flexibility in mind, to adapt to changing circumstances or technological developments. This means that the roles of different applications will have to overlap to a small degree, with emphasis placed on the integration of the whole concept.

Standard software packages are not of the same quality as dedicated word processors for text manipulation, both in the number of functions and in the standard of the screen," explained William McKee, chief executive at Merton.

At Merton, the motive for installing word processing equipment – a cluster of four terminals linked into a Wordplex System 7 shared logic CPU, plus two stand-alone 803 systems – was to save money, and this has been achieved.

Within secretarial or clerical environments there is often a need, for example, while typing a report to refer to outside information which may be held on a database. To handle this situation efficiently, the word processor workstation must be capable of performing more than one interactive task simultaneously, although the majority of computer operating systems are incapable of achieving this at the moment.

Further improvements in efficiency have been made through holding basic standard documents on file, such as legal documents, leases and other documents involved in council house sales. These only need minor amendments before a complete new personalised document can be issued, and a register of the borough's 162,000 residents is held to facilitate this.

The need to store complex documents for periodic updating and

re-issue is one common to many organisations. Probably few of the 14 million customers who shop at Marks and Spencer each week realise what a large part word processing plays in their choice of goods.

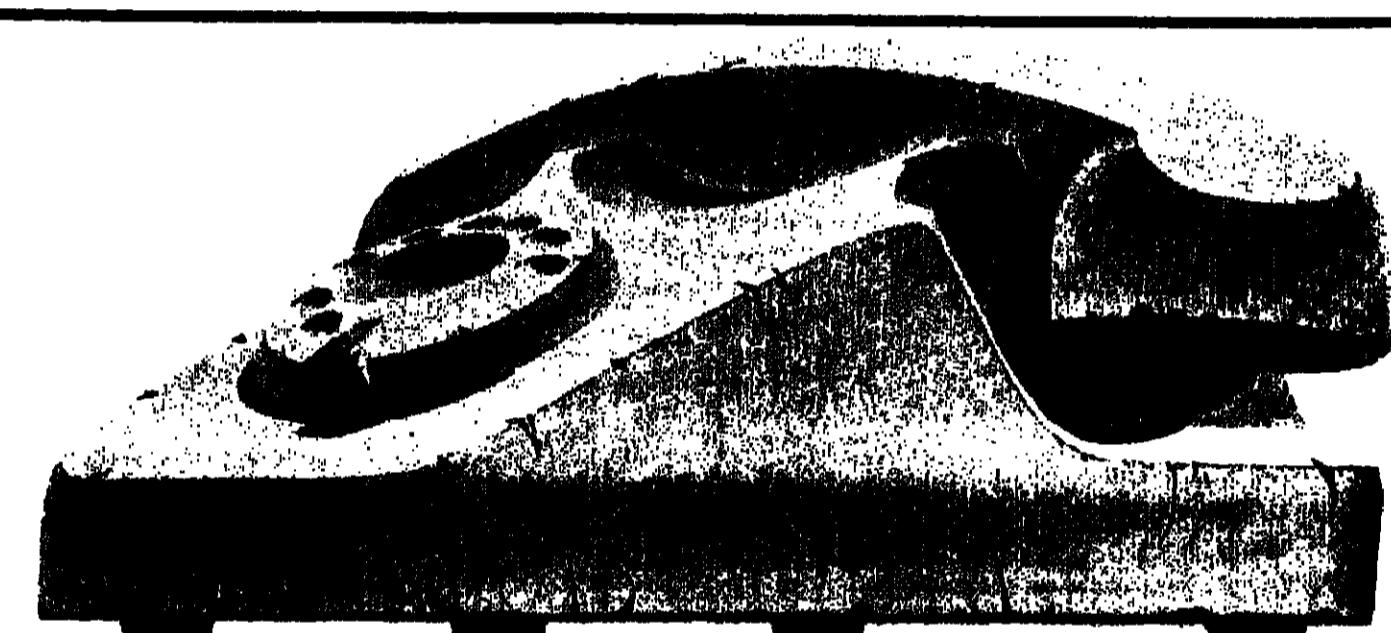
Since 1976 when the first stand-alone system was installed as an experiment, Marks and Spencer has built up a word processing unit with 12 terminals connected to a Wordplex System 7, and other stand-alone systems for directors' use. About 60% of processing time is devoted to re-vamping program specifications for the DP department, but a further significant proportion is spent on preparation

of checking list summaries. A checking list summary is a detailed stock and sales report compiled from details of selling prices, stock-in-hand and stock-on-order sent in by the 260 UK stores. Each department occupies two screens full-time for a week, but which has reduced the amount of time spent on each document from 65 minutes to 37 minutes.

Once completed, the checking list summaries are sent to food and textile departments to form the basis upon which they will order new goods, or adjust sales of existing ones.

Marks and Spencer is anxious only to use technology where it benefits the company, but this has not prevented the company (which had a turnover of \$2,505 million for 1983) from being a great innovator of new working methods. Acting upon a philosophy of capturing keystrokes only once, it is pioneering use of an OCR (optical character recognition) machine to input draft documents to a word processor.

Having standardised on the Courier 10 typeface for all its typewriters, Marks and Spencer has now invested in a Mitsui OCR document reader so that paperwork produced on any typewriter in the company may be fed direct to the word processor CPU for manipulation later.



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They have one thing in common. They all add value.

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You'll find a superb example in our Diavox 824 System. An electronic office communication system that brings the latest in business efficiency to the smaller company.

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As a key system with no operator. As an executive/secretary system. As a call distribution system. Even a combination of these.

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We believe, however, we can show every business how our telephone systems can make a positive difference to the way it works.

One that can be measured in £s.

The coupon is the first step.

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Few Marks and Spencer shoppers realise how much the store depends on word processing.



How many files can you allow a secretary to access?

## The Key Specialist Event in the Computer Year

Sponsored jointly by the Peripherals Suppliers Association and 'Systems International', Peripherals '84 has justifiably been named the *only* specialist show for computer professionals.

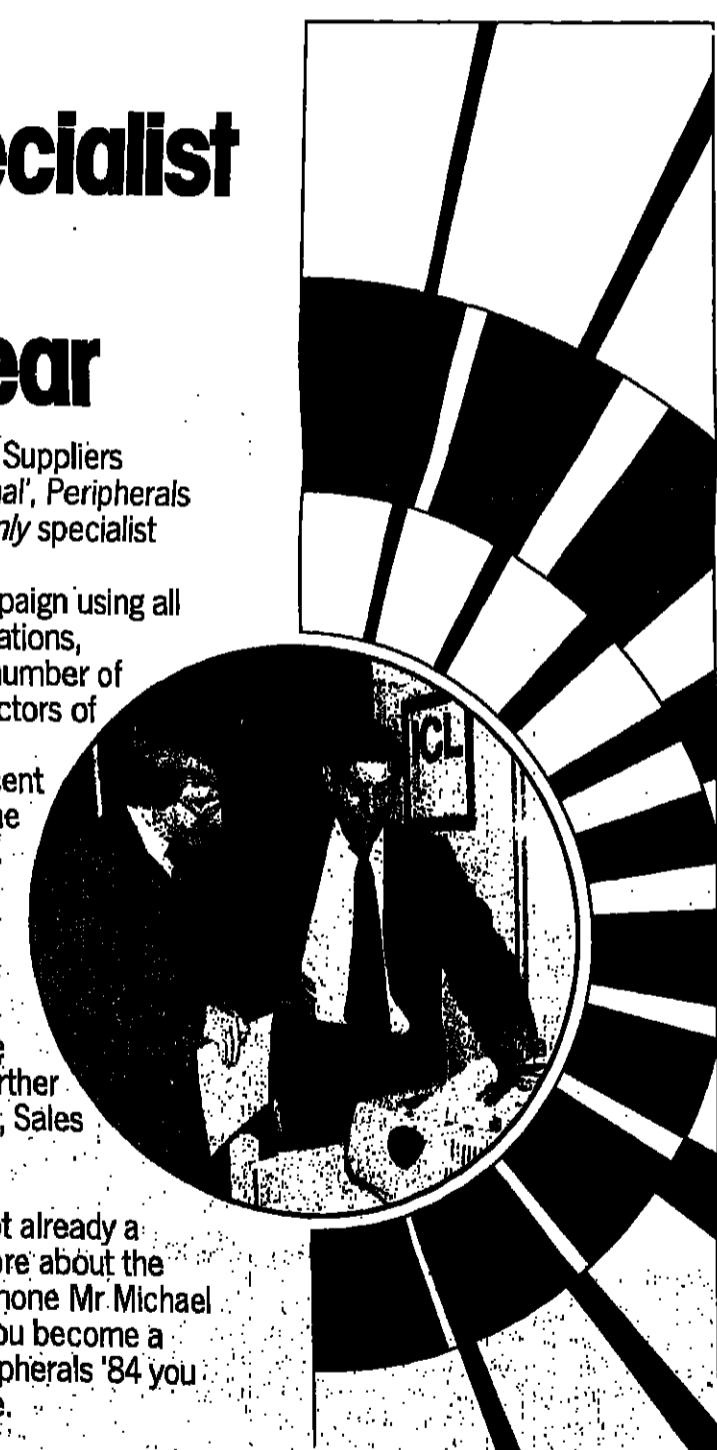
Through a massive publicity campaign using all the key systems development publications, Peripherals '84 will attract a record number of visitors from purchasing/specifier sectors of this continually expanding market. Attendance in 1983 was up 25 per cent on 1982. And 1984 is all set to be the biggest and most successful to date.

This is the buyer/specifier confrontation of the year. Don't miss it.

### How to Book Your Stand

This is the key specialist event in the Computer Year – ACT NOW – for further information telephone Ian Hardman, Sales Manager on 01-661-3022.

PSA members are eligible for a preferential stand rate. If you are not already a member and would like to know more about the association's aims and objectives phone Mr Michael Perry on 0908 668118. Provided you become a member before the opening of Peripherals '84 you can claim the special members rate.



For more information return this coupon to Ian Hardman, Peripherals '84, Room L216, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.

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# How Scrapbook found some 18th century art

The United Trading Group found more than it bargained for when it modernised its Queen Anne office

FROM its restored Queen Anne mansion at Fetcham Park, Surrey, the United Trading Group (UTG) controls a network of subsidiaries, associate companies and representatives in 23 countries.

Because its traditional mainstay has always been trading, with operations ranging across a wide spectrum of commodities, the group has to have some way of controlling and organising the massive data flows these operations generate.

The problem was posed, around four years ago, before the group moved to Fetcham Park. "The UTG board decided it had to find some form of centralised filing system," explained Eddie Board, group computer projects manager.

At that time Board was a consultant with a software house that had

done work for UTG several times in the past. Once the UTG Board had decided to look into the issue of a centralised filing system, it set up a working party and asked the software house to draw up the specifications for a computerised "electronics office" approach to the problem. Board emphasised that this was just one option alongside a number of different options looked at by the UTG working party.

When his report was completed, the working party sent the specifications to a number of computer companies and asked them to tender for the contract, in order to get a more accurate sense of the potential costs of this solution.

Among the companies who expressed interest was Systime, who wrote back to UTG telling it about

data flowing through its system.

In consultation with UTG, which was keen to develop a communications side of its package, Board modified the plan to allow all incoming and outgoing telexes to pass through Scrapbook. As the system now exists, any telex at any terminal can generate telex, with the full word processing facilities for editing the telex.

In addition to communications, all the paperwork that the business normally generates, from shop documents, to draft contracts, memos and reports, is processed using Scrapbook. Unlike many levers in the electronic office, Board does not put much value on the idea of a paperless office, as the aim has been to use Scrapbook to generate any necessary paperwork rather than to use it to replace paper.

His view is that paper will always be a part of office life. "I can't pick a terminal up and sit down to the pub to browse over during lunch," he said. "An office organisation like this, where executive can find himself

"You can't pick a terminal up and take it to the pub to browse over at lunch"

work, they tend to blame the people who bought it, the equipment itself and the equipment vendor.

Sometimes, when inadequately prepared organisations attempt to plan and manage their own installations, they take considerable risks with their future. For example, a poorly managed installation may soon be regarded as a source of confusion, irritation, and a waste of time and money.

The return on the office automation

tions are not adequately prepared to take maximum advantage of all of the opportunities that office automation can offer.

In some instances, the quality of office automation management has been so poor that severe organisational problems have resulted, including the sabotage of expensive equipment, and strikes.

When inexperienced organisations attempt to implement an office automation plan, whether from a consultant or vendor, or

from corporate goals and objectives, workflow and procedures, manpower planning, communication patterns, lines of authority and responsibility, activity scheduling, and market and sales forecasting.

In addition, office automation has an impact on morale and issues such as job security and confidence, and attitudes and beliefs about the corporate social and political system.

Until now, no manufacturer has developed a stand-alone product that can help its customer to integrate office automation technology into its own organisation. And few manufacturers have developed a systematic procedure for planning, implementing and monitoring an office automation installation that reflects consideration for the total organisation – its environment, its people and how they get their work done, and the company's products and services.

Wang is currently developing a "Human Factors Programme"

tion investment becomes valuable only when the organisation begins to achieve the benefits of the technology. The longer it takes an organisation to achieve those benefits, the more doubtful it becomes about the validity and credibility of the technology. It is therefore in the best interests of the buyer, the vendor, and the industry that the operation runs successfully as soon as possible.

When an installation is completed, the customer is left with the task of integrating the system into its corporate workflow, procedures and culture. When the organisation is experienced in guiding and directing its own planned growth and development, this integration may be achieved relatively smoothly.

In addition, most vendors will do their best to help their customers to become fully operational. They will often offer a lot of help to ensure that the customer staff are prepared and trained, that the electrical and other physical requirements are taken care of, and that the right people are assigned to supervise the equipment and its operation.

When workers do not or will not learn to use equipment properly, or when they are unclear about their new job requirements and how they are expected to do their

work, they tend to blame the people who bought it, the equipment itself and the equipment vendor.

In extreme situations, it may be found that the hardware and software work perfectly well, but the organisation suffers from chaos and confusion. This reminds one of the surgeon who says: "The operation was a success but the patient is dying."

When office automation technology is introduced into any large corporation, many aspects of its operation are affected. For example, the physical environment is affected with video display units in places once reserved for typewriters. Disk drives and printers appear in place of filing cabinets and other office storage furniture.

The physical environment is not the only area affected by office automation. Other areas include company planning and organisa-

tion, corporate goals and objectives, workflow and procedures, manpower planning, communication patterns, lines of authority and responsibility, activity scheduling, and market and sales forecasting.

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one prepared by themselves, they often use trial-and-error methods. These methods can be expensive and time consuming.

During this "trial-and-error" period, the organisation may be required to solve unfamiliar problems and make decisions with limited skills and experience. Productivity may decline, profits may diminish, and clarity of organisational purpose may become lost. Mistakes are easy to make and the inefficient use of human, physical, and financial resources can become costly.

It is important that user organisations learn how to take maximum advantage of the opportunities that office automation provides.

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In extreme situations, it may be found that the hardware and software work perfectly well, but the organisation suffers from chaos and confusion. This reminds one of the surgeon who says: "The operation was a success but the patient is dying."

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Reg Broughton demonstrates a typical Wang office automation installation.

# Suit the office to human occupants

For the best results, office automation should be considered from the viewpoint of everyone it affects, writes Reg Broughton



Physical environment is affected by automation: printers and keyboards make noise, machines give off heat, work spaces may be rearranged and lighting conditions may vary from one part of the office to another.

Employees' attitudes and beliefs about the equipment and its benefits need to be positive. Successful training requires proper confidence, trust and adequacy.

Office automation needs to be viewed as an investment made for total corporate benefit, and not just for a privileged few.

The decision to buy office automation technology represents the first major step towards a transition from a traditional way of handling information to a new and vastly improved way.

The transition from the old to

the new should be regarded as a very high priority project, deserving continuing support and commitment from everyone within the organisation.

Because human beings are affected by their environment, so the physical environment of the office is an essential human factor.

Finally, it is assumed that because the planning, implementation, and evaluation of office automation is a high priority project, it deserves a qualified and dedicated group of people to accept accountability for the success of that project.

The purpose of Wang's Human Factors Programme is to help large user organisations to plan, implement, and evaluate the management of their own office automation installations.

The methodology focuses on how the people in the user organisation get their work done, how they work together to accomplish the goals of their company, and on the environment and the quality of work life that they face for at least eight hours every day.

Reg Broughton is director of marketing support services with Wang UK.

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## STOCK MARKET

What's so special about the USM? Judith Morris reports

# Everybody wants a share of the USM

THREE years ago the success story of a company like Apple - begun by two men in a garage and now incredibly prosperous - could never have been repeated in this country.

Until 1980, there was no vehicle for risk capital to be placed in the kind of entrepreneurial small-start up company, like Apple, which formed the basis of the computer boom.

But now, anything is possible, thanks to the opening of the Unlisted Securities Market (USM).

However, even given the present enthusiasm for computer stocks, it seems unlikely that more than one or two of the computer companies listed on the USM will join the Apple league.

The Unlisted Securities Market, launched in November 1980, opened up the advantages of the London Stock Exchange to growing companies which previously had no way of raising finance except by private funding or loans.

The market's primary aim was to stimulate the economy and revitalise the Stock Exchange. It has worked, with every new issue coming on the market being leapt on in the firm belief that 90% of stocks offered one month will be higher the next.

The USM has also given the computer industry an unusual charm, triggered by the current blind faith of the City in any computer-related activity, and assisted by the conviction of this and previous governments that if there is any future for the UK economy, then it must lie in the areas of new technology.

But surprisingly, only 20 of the 175 companies listed on the USM are in the computer industry, although this figure is expected to grow dramatically now that the staggering success and potential growth of companies who have recently done it has been so widely publicised.

According to City analysts, Micro Focus was successful because, unlike many other computer companies, it has a very distinctive market niche, a virtual monopoly and is already internationally established. Even those who cannot understand the nature of the company's products can see, at least, the sense in that.

Like CPU, Micro Focus chose - or was advised by a merchant bank to choose - to offer its shares for sale by tender, the most expensive route to the USM, but the one which ensures the highest possible price per share.

Although new computer companies have any short-term plans to move to a full listing, many realise that as more and more companies go on the USM with the minimum of requirements, the riskier it will become, and the more sense a full listing makes.

Most companies put the kudos of being a quoted company as one of the main advantages, after the ability to raise cash, although as the USM is still in its infancy it is difficult to put a value on the extent to which people have more confidence in a USM firm.

DPCE, for example, which went for a full listing on the Stock Exchange, takes the attitude that cash and given the sort of business it is in - maintenance - stresses that it needs the respectability of a full Stock Exchange listing.

There are some disadvantages for computer companies going on the USM. The very fact that the company is more public and expensive can be difficult to take for a small firm which has grown used to keeping itself to itself.

Managing directors, who are usually founders, suddenly find themselves talking to stockbrokers and merchant banks when they would be more happily employed in the day-to-day running of their company.

At the moment, the company's shares stand at £1.80, 55 pence more than they were originally sold for in 1980.

Another company with an early

USM quotation and a low bill is DEC OEM Rolfe and Nolan, which paid only £30,000 when it moved from Rule 163 to the USM in January 1981. Managing director Malcolm Rolfe said he would have been "very surprised" if it had cost him more. However, the company raised the relatively small sum of £120,000, and shares now stand at a fairly stable £1.80.

The mixed bag includes software companies, micro manufacturers, bureaux, maintenance companies, recruitment companies and many who don't have a secure niche in the market and who will have lost their driving force in a few years.

One of the most recent additions to the USM is UK micro maker CPU Computers - which operates through CPU Peripherals, Syncet, and LSI. At the end of last month CPU offered four and a half million ordinary shares for sale by tender, at a minimum share price of 105 pence. It cost the company £300,000 to do it, and it raised £735,000. Services company Triplin paid £51,000 in expenses for a placing - and raised £37,000.

The greatest market interest was stimulated this year when Micro Focus appeared on the USM. The company raised £3.7 million, less £100,000 expenses. Only about five other companies on the USM have raised over £3 million, and those have come from more established "glamour" industries such as television and oil.

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previously traded on the limited dealing market of the Stock Exchange's Rule 163, from which the USM was formed. Chairman Martin Baldwin claims that the publicity of being a founder member has done the company good.

"It raised money for the company and some for me as well," he explained. "Once you've got a quid, albeit a USM, you have a chance for funding or acquisition. The company is more public and expensive can be difficult to take for a small firm which has grown used to keeping itself to itself."

Scandata placed all its shares privately by the time it was quoted on the USM, which is one of the cheapest ways of doing it. It cost the company a mere £70,000 - well below the average cost - and raised about £1.6 million.

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Another company with an early



FITZPATRICK

BALDWIN

ROLFE

## PEOPLE

## Institute honours Dr Brown

Dr Peter Brown, professor of computer science at the University of Kent, has been honoured by the Institution of Electrical Engineers. Together with a colleague, M. D. Roberts, he has been awarded the Hartree Premium for a paper published in one of the institution's journals. The paper described work done at Stanford University in California, to which Brown was invited as visiting professor in 1980. He worked with Roberts, a student at Stanford, on the design of silicon chips to make it easier for computers to process English words rather than numbers.

Although expenses and amounts

raised vary considerably, an average cost for entry to the USM

would be about £150,000. To look at a few examples, it recently cost Irish company Memory Computers £244,000 for a placing which raised nearly £3 million. System supplier Miles (33) paid only £45,000 for a placing which raised £735,000. Services company Triplin paid £51,000 in expenses for a placing - and raised £37,000.

But managing director Tom Fitzpatrick did not see it as an easy task. He claims it took the company two years to get on the USM, with four or five months spent on writing the prospectus alone. The average timescale for preparation for entry to the USM is six months from start to finish.

"A lot of companies don't realise what it entails," he said. "We were taken over very carefully by the merchant banks and the Stock Exchange. However, we are now able to acquire companies, although we did make two acquisitions without the USM."

"There has been an amazing number of new companies formed over the past few years," he commented, "but they won't make it in the long run, it's just a boom. Being established on the Stock Exchange means you have to be a company of some standing."

One of the first companies to realise the potential of the USM was Scandata, which went in November 1980, on the first day the facility became available. It had

been established on the Stock Exchange for a full listing, and the market believed that it had a future.

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Hunterskill South, a new regional office in Maidenhead, consists of Nick Gill and a team of sales consultants. Gill has been involved in sales and management training since leaving his position as managing director of KPG Computing Services in 1980.

Pactel has appointed Tony Bowden (below) to head its telecommunications systems implementation projects. He has extensive experience in message switching and data communications. He was previously with Silicon Consultancy International and Marcol Computer Services.

■

■ Tom Hohenberg has been appointed marketing manager of Acorn Computers of Cambridge, maker of the BBC Microcomputer. Previously, he was director of marketing at A. M. Adnet, the engineering graphics division of A. M. International. Acorn has also appointed John Caswell art and promotions manager. He used to be with the design company Optimus, for three years, working on various electronics companies accounts, including Acorn's.

■ Terry Short has been appointed general manager of Data Packaging, Mullingar. He joined Data Packaging in November 1980 as moulding manager. The company has also announced the appointment to the board of directors of James Kavanagh. Kavanagh joined Data Packaging as financial controller in June 1982.

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■ Carolyn Allen has been appointed group data processing manager by Ayrton Saunders, the Liverpool-based pharmaceutical company. The wholesale division of Ayrton Saunders has a T1900/10 installation in each of its three warehouses: Liverpool, Stoke-on-Trent and Birkenhead. These are used for order processing, inventory control and sales ledger.

■ David Craft has been appointed joint managing director of a new computer services bureau, Bellatrix Computing, based in Huddersfield. He was formerly senior sales consultant of Goldsmith Computing. Peter Lynch has been appointed the other joint managing director. He was previously director of Goldsmith Computing, where he headed the contract recruitment division and the north-east computer services marketing operation.

■ Data has appointed Mel Pashley as data systems sales executive.

With responsibilities for the sale of Harris Series 1600 and 9200 terminal systems in the Midlands and the West, Pashley is based at the company's Manchester office. He joins Harris from Sperry Univac where he was sales executive for its terminals, mainframe and minicomputers.

■ David Forewick has been appointed sales and marketing manager of Clio Computing Systems, the London-based specialist in high performance, expandable, networking multi-processor systems and special application software. Previously with Rank Xerox and UCSL, he will have full responsibility for expanding Clio's business in the multi-user market, with special emphasis on stockbroker, motor agent, staff rostering and membership records systems.

■

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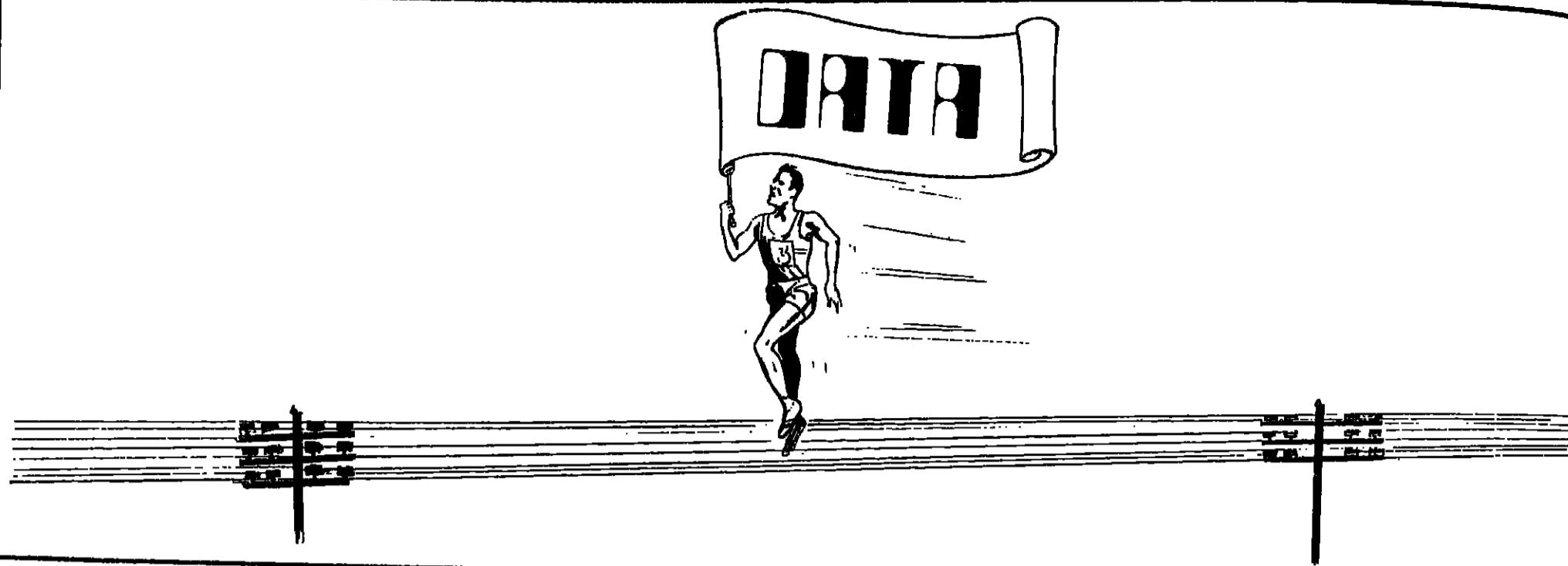
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■ To help develop the expanding network of dealers for the 16-bit Professional Computer, Wang has appointed Kim Warren (above) as independent sales organisation account manager. In 1982, Warren was promoted to customer support manager with Electronic Office Services, an Apple and Sirius dealer and a major importer of IBM Personal Computers prior to the official launch.

■ Drafting and Design Systems of Nottingham, specialist supplier of computer systems for industrial use, has appointed Alan Robinson as sales manager. Among the posts he has held are those of civil engineering manager at UCC (GB), and at Benson Electronics, where he was a member of the successful field sales team.

■ Yvonne Caunter has joined MSA (Management Science America) as marketing assistant. Her main responsibilities will be for seminars, exhibitions and research. She was previously sales and marketing administrator at Kepner Tregoe. Howard Butler has also joined MSA, as marketing representative. Prior to his new appointment he spent 13 years with ICL as account consultant.

■ Computer Technology Limited has appointed Mike Rogers as personnel manager. He will co-ordinate the personnel function within CTL and advise on personnel and procedural policy for the Information Technology Group as a whole. He worked with Volvo Concessions for five and a half years.



# Search for higher speed and greater reliability goes on

Tony Dench of Racal-Milgo explains how modems are becoming faster and more efficient to suit users

IT WAS relatively easy for telecommunications engineers to rise to the challenge from computer users and exploit existing voice telephone networks to carry computer data.

The medium offered existing and very comprehensive coverage of most technologically advanced countries and proved immensely practical for carrying data at speeds up to and above 9,600 bits per second.

Over the past decade, however, computer technology has gradually outgrown the technical compromise of voice-grade telephone lines and network planners are now looking to the digital network to provide the medium for a new generation of ultra-high speed data communications.

The change will be slow - with finance playing a major role - and it is generally accepted that it will be a good 10 years before truly international digital networks can be taken for granted.

The problems which still confront the data communications specialist are how to make the best use of existing analogue networks and how to satisfy the computer users' calls for still higher speeds and greater reliability while working within the telephone line's limitations.

This article will discuss data communications at 9,600 bps - the most commonly used "high-speed" - and detail the emergence of a new technique which promises better and more reliable data communications.

Although the human voice has a wide bandwidth, that is it covers a large noisy frequency range, the information conveyed in speech can be propagated within a comparatively restricted bandwidth.

Recommendation V21 modems are mainly used for dial-up operation over the PSTN (Public Switched Telephone Network), as they can simultaneously transmit in both directions. However, Recommendation V21 modems and other similar modems can only operate at speeds of up to 300 bps.

The next step in modem development was to use a separate transmit and receive circuit and a wideband FSK signal. It should be noted that while FSK modulation is simple, cheap and effective, it requires a comparatively large bandwidth and is inefficient in terms of throughput on a telephone channel.

The lowest transmitted carrier frequency has to be higher than the data signalling rate or it would be impossible to detect at the receiver. (If the frequency were lower, less than one cycle would be transmitted per bit.)

Using a separate transmit and receive circuit, (known as a four-wire circuit, because four wires were involved - two for transmit and two for receive) data signalling rates of 1,200 bps can readily be achieved, with a secondary speed of 600 bps being available if required.

As the need for high speed data transmission increased so did the demand for efficient line codes and synchronous transmission was largely adopted by computer manufacturers for speeds of 2,400 bps and above. Figure 1 shows a "Constellation" diagram for DPSK signalling; the example given is CCITT Recommendation V27, which is for a speed of 4,800 bps.

Each point on the diagram, or

most notably from 4 x 4.

The V29 Scheme is basically a extension of the Recommended V27 DPSK Scheme, introduced two-level amplitude modulation (AM).

Figure 2 shows the Constellation Diagram for the Recommended V29 Modulation Scheme. As in the V27 Constellation Diagram, phase change is depicted by angle of rotation from the 0° axis and amplitude is represented by the distance from the symbol to the center of rotation.

The table shows the four-bit or quadbit, data assignment of each of the 16 symbols. The line signalling speed for Recommendation V29 Modulation (and also for 4 x 4 Modulation) is 9,600 bps per symbol = 1,600 symbols per second.

Data transmission at 9,600 bps

was the next hurdle. It is worthy of note that 9,600 bps data transmission is still the most significant of the higher speeds and 9,600 bps modems account for 30% of the total European modem market.

The techniques used to transmit data at 9,600 bps are various, but we will only consider the two predominant types; the Recommended V29 scheme and the technique known as 4 x 4. Recommendation V29 was ratified by the CCITT in May 1976, against fierce competition from other schemes.

The economy of this form of modulation is obvious; for a doubling of transmission speed over the Recommended V27 1,200 bps modem, eight times the

time is required. The 4 x 4 Modulation Scheme is considered a major contribution to the continuation of efficient and cost effective 9,600 bps data transmission.

With FSK techniques the line signalling speed, measured in units/second, is the same as the computer transmission speed and at lower speeds bidirectional transmission is possible. Recommendation V21 of the International Standards body, the CCITT, operated in Phase Quadrature and this gives QAM its name. (It should be



## From Page 24

number of data bits can be transmitted per unit time.

The 4 x 4 scheme is similar to Recommendation V29 in that it also operates at a line signalling speed of 2,400 bps and utilises 16 symbols. The principal differences are that the symbol locations are given as cartesian (rectangular) co-ordinates and not polar co-ordinates as in Recommendation V29 and that the symbol co-ordinates are absolute and do not change with respect to the previous symbol sent. As can be seen from the figure, each of the eight symbols is assigned a three bit, or tribit, value and represents three data bits. Therefore, the line signalling speed is: 4,800 bps/3 bits per symbol = 1,600 symbols per second.

Obviously FSK techniques were going to restrict data transmission speed and so the leap was made to Phase Shift Keying (PSK), Differential Phase Shift Keying (DPSK), Amplitude Modulation/Differential Phase Shift Keying (AM/DPSK) and Quadrature Amplitude Modulation (QAM) Schemes.

Phase Shift Keying operates in the same manner as FSK, except that the phase is altered instead of the frequency. It did not prove particularly suitable for data transmission and was only of use for asynchronous or anisynchronous codes. Differential Phase Shift Keying, however, proved to be eminently suited to synchronous transmission.

The next step in modem development was to use a separate transmit and receive circuit and a wideband FSK signal. It should be noted that while FSK modulation is simple, cheap and effective, it requires a comparatively large bandwidth and is inefficient in terms of throughput on a telephone channel.

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normally applied to prevent loss of synchronisation on continuous data patterns.)

Figure 3 shows the 4 x 4 Modulation Scheme and the effect of placing the symbols by means of cartesian co-ordinates is immediately apparent; none of the symbols are located on the perpendicular axes. QAM techniques, considered theoretically, utilise two simultaneous carrier frequencies of the same frequency, but with a fixed phase difference of 90°; hence they are considered to be in Phase Quadrature and this gives QAM its name. (It should be

noted that the term QAM is often used for AM/DPSK Modulation Schemes which do not or only partially employ quadrature amplitude modulation).

Now to the on-line comparison of 4 x 4 and V29 modulation.

Both schemes are a combination of phase and amplitude and both require a line signalling speed of 2,400 baud to transmit data at 9,600 bps.

The similarity of the two schemes means that in practice they do not perform altogether differently. The 4 x 4 scheme though

has two distinct advantages in

terms of performance over Recom-

mendation V29; one is its increased immunity to "amplitude hits" and the other is its increased performance on noisy lines and in particular on PSTN dial-up calls.

Amplitude hits are caused by automatic route switching (in the event of the primary route failing) or transient AGC (Automatic Gain Control) operation on the trunk network carrier system. The form of disturbance amplitude hits cause is a momentary jump upwards or downwards, of receive level. This may cause loss of synchronisation between transmitter and receiver and corrupt the

data being transmitted during the "hit."

Any modem offering increased immunity to this disturbance must be of major advantage to data transmission users.

The increased performance of the 4 x 4 scheme on noisy lines should increase the data throughput. Data throughput is a measure of the actual data correctly received by the receiving device and is usually less than the data transmission speed. The main reason for this is the "block retransmission" system of error correction, often referred to as ARQ (Automatic Return Query).

With this form of error correction each received datablock is checked for errors. If any errors are received a supervisory message is returned to the transmitting device requesting the last block to be retransmitted.

It is apparent that any slight increase in performance on noisy lines could substantially improve data throughput efficiency.

The MPS96 is based upon the very successful MPS601 and MPS629 range of modems and has all the same options. This includes the "Fastram" option for multipoint circuits which provides an ultra-fast turn-around time of 30 milliseconds. CCITT Recommendation V29 specifies a turn-around (RTS-CTS delay) of 253 milliseconds.

Furthermore the increased performance of the 4 x 4 scheme will make 9,600 bps dial-up operation more efficient and therefore more cost effective. The 4 x 4 Modulation Scheme is considered a major contribution to the continuation of efficient and cost effective 9,600 bps data transmission.

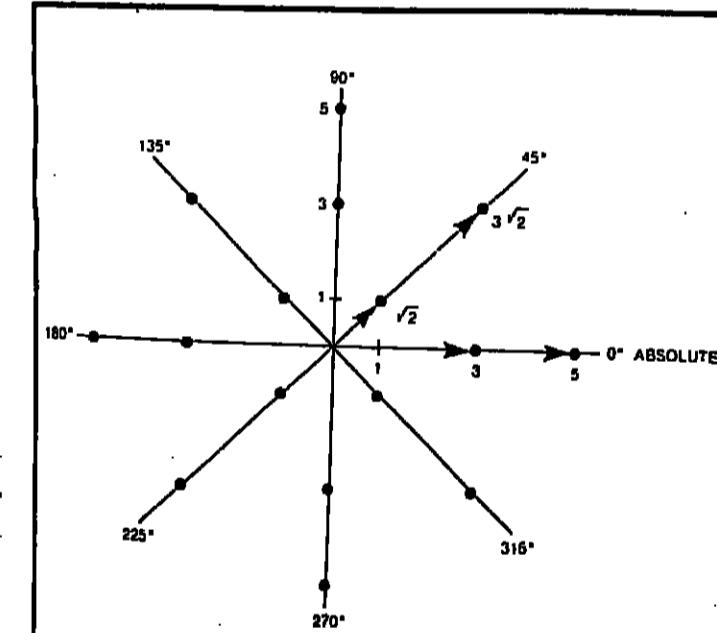


Figure 2. V29 constellation diagram.

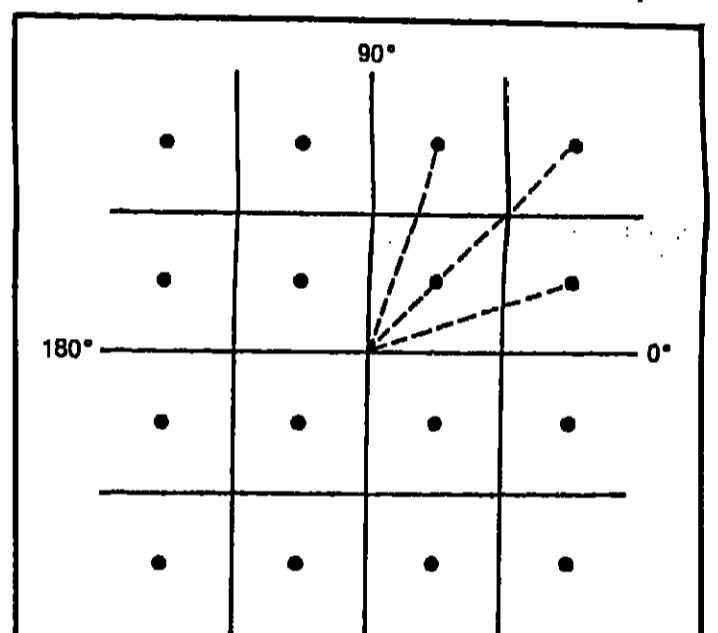


Figure 3. 4x4 constellation diagram.

Continued on Page 25

symbol, represents a phase change angle. (In simple PSK the same diagram would apply, but the phases represented would be absolute and not change with respect to the previous phase sent.) As can be seen from the figure, each of the eight symbols is assigned a three bit, or tribit, value and represents three data bits. Therefore, the line signalling speed is: 4,800 bps/3 bits per symbol = 1,600 symbols per second.

Obviously FSK techniques were going to restrict data transmission speed and so the leap was made to Phase Shift Keying (PSK), Differential Phase Shift Keying (DPSK), Amplitude Modulation/Differential Phase Shift Keying (AM/DPSK) and Quadrature Amplitude Modulation (QAM) Schemes.

Phase Shift Keying operates in the same manner as FSK, except that the phase is altered instead of the frequency. It did not prove particularly suitable for data transmission and was only of use for asynchronous or anisynchronous codes. Differential Phase Shift Keying, however, proved to be eminently suited to synchronous transmission.

The next step in modem development was to use a separate transmit and receive circuit and a wideband FSK signal. It should be noted that while FSK modulation is simple, cheap and effective, it requires a comparatively large bandwidth and is inefficient in terms of throughput on a telephone channel.

The lowest transmitted carrier frequency has to be higher than the data signalling rate or it would be impossible to detect at the receiver. (If the frequency were lower, less than one cycle would be transmitted per bit.)

Using a separate transmit and receive circuit, (known as a four-wire circuit, because four wires were involved - two for transmit and two for receive) data signalling rates of 1,200 bps can readily be achieved, with a secondary speed of 600 bps being available if required.

The need for high speed data transmission increased so did the demand for efficient line codes and synchronous transmission was largely adopted by computer manufacturers for speeds of 2,400 bps and above. Figure 1 shows a "Constellation" diagram for DPSK signalling; the example given is CCITT Recommendation V27, which is for a speed of 4,800 bps.

Each point on the diagram, or

most notably from 4 x 4.

The V29 Scheme is basically a extension of the Recommended V27 DPSK Scheme, introduced two-level amplitude modulation (AM).

Figure 2 shows the Constellation Diagram for the Recommended V29 Modulation Scheme. As in the V27 Constellation Diagram, phase change is depicted by angle of rotation from the 0° axis and amplitude is represented by the distance from the symbol to the center of rotation.

The table shows the four-bit or quadbit, data assignment of each of the 16 symbols. The line signalling speed for Recommendation V29 Modulation (and also for 4 x 4 Modulation) is 9,600 bps per symbol = 1,600 symbols per second.

Data transmission at 9,600 bps

was the next hurdle. It is worthy of note that 9,600 bps data transmission is still the most significant of the higher speeds and 9,600 bps modems account for 30% of the total European modem market.

The techniques used to transmit data at 9,600 bps

are various, but we will only consider the two predominant types; the Recommended V29 scheme and the technique known as 4 x 4. Recommendation V29 was ratified by the CCITT in May 1976, against fierce competition from other schemes.

The economy of this form of modulation is obvious; for a doubling of transmission speed over the Recommended V27 1,200 bps modem, eight times the

time is required. The 4 x 4 Modulation Scheme is considered a major contribution to the continuation of efficient and cost effective 9,600 bps data transmission.

With FSK techniques the line signalling speed, measured in units/second, is the same as the computer transmission speed and at lower speeds bidirectional transmission is possible. Recommendation V21 of the International Standards body, the CCITT, operated in Phase Quadrature and this gives QAM its name. (It should be

noted that the term QAM is often used for AM/DPSK Modulation Schemes which do not or only partially employ quadrature amplitude modulation).

Now to the on-line comparison of 4 x 4 and V29 modulation.

Both schemes are a combination of phase and amplitude and both require a line signalling speed of 2,400 baud to transmit data at 9,600 bps.

The similarity of the two schemes means that in practice they do not perform altogether differently. The 4 x 4 scheme though

has two distinct advantages in

terms of performance over Recom-

mendation V29; one is its increased immunity to "amplitude hits" and the other is its increased performance on noisy lines and in particular on PSTN dial-up calls.

Amplitude hits are caused by automatic route switching (in the event of the primary route failing) or transient AGC (Automatic Gain Control) operation on the trunk network carrier system. The form of disturbance amplitude hits cause is a momentary jump upwards or downwards, of receive level. This may cause loss of synchronisation between transmitter and receiver and corrupt the

data being transmitted during the "hit."

Any modem offering increased immunity to this disturbance must be of major advantage to data transmission users.

The increased performance of the 4 x 4 scheme on noisy lines should increase the data throughput. Data throughput is a measure of the actual data correctly received by the receiving device and is usually less than the data transmission speed. The main reason for this is the "block retransmission" system of error correction, often referred to as ARQ (Automatic Return Query).

With this form of error correction each received datablock is checked for errors. If any errors are received a supervisory message is returned to the transmitting device requesting the last block to be retransmitted.

It is apparent that any slight increase in performance on noisy lines could substantially improve data throughput efficiency.

The MPS96 is based upon the very successful MPS601 and MPS629 range of modems and has all the same options. This includes the "Fastram" option for multipoint circuits which provides an ultra-fast turn-around time of 30 milliseconds. CCITT Recommendation V2

# Extension of digitiser technology

A SONIC digitiser, the Model GP-8, has been announced by Science Accessories Corporation, to extend sonic digitiser technology, making this information handling and processing technique available to new applications.

The GP-8 mates the new technology and packaging developed for the GP-7 Grafbar digitiser with the capability of the L-frame microphone array used for years with the GP-3 and GP-6 series digitisers.

The GP-8 features an 8-bit microprocessor which permits the system to perform five standard program functions via menu entry, including Origin, Line, Metric, Stream, and Cancel. The five-function menu may be located anywhere in the active area, as specified, and the menu may be erased by dip switch control, providing an unencumbered work area with no loss of the last input function.

Another feature is two-way communication, permitting remote computer control of all digitising functions. Remote trigger capability is also offered.

Either stylus, cursor with cross-hairs, or both may be used with the GP-8 to take data and to make menu selections. The stylus contains both the sonic energy element and a ballpoint cartridge in choice of ink colours. When hard copy is not required, an inkless cartridge may be substituted.

A plastic, needlepoint, non-scratching stylus for use with X-



A SERVICE introduced on Prestel changes the traditional picture of chess as a table-bound game. Called Mailbox Chess, the new facility allows any chess player who is also a Prestel user to challenge electronically other Prestel users to a game, and to conduct each move of the game through Prestel's message service. Some 50 chess enthusiasts are already listed on Prestel's chess directory, and the service is heavily used, with many games played

through Prestel's electronic Mailbox. Prestel Mailbox also allows any Prestel user to send instant messages to any other Prestel user and has many business as well as home applications.

Our picture shows eight-year-old Charles Henderson, from Kingston, Surrey, sending his move through Prestel to his opponent.

Measurement Systems (CW), Mill Reef House, 9-14 Chapel Street, Newbury, Berkshire. Tel: (0635) 45420.

Measurement Systems (CW), Office Equipment Division, Shepley Street, Audenshaw, Manchester M34 5JD. Tel: 061-330 6531.

## CAE system runs in dual mode

A COMPUTER-AIDED engineering station for the design of digital electronic systems that functions both as a standalone 32-bit based CAE design station and as part of a computer network including mainframes, has been announced by Valid Logic Systems.

Called Scaldsystem II, the unit can operate with all Scald software validation tools as a design station or as part of a host-based configuration. When in a standalone mode the system gives the designer a dedicated 32-bit processor for validating designs, plus a 16-bit processor for graphical capture of schematics.

A range of communication facilities allows the Scaldsystem to communicate with hosts or other systems such as the Scaldsystem or Scaldstar. These include both parallel and serial ports, and a Ethernet networking capability. Data can be transferred at a speed of up to 10MHz.

The high data transfer rate allows fast interfacing between units for processing large simulations and design validations, as well as for data sharing within an organisation. Terminal emulators of VT-100 or 3270 is also available.

Scaldsystem II incorporates de Scald software tools that are used in all Valid design systems.

Valid Logic Systems (CW), 69 N. Mary Avenue, Sunnyvale, California 94086.

The VDN 52500 terminal from Aim Digital Systems.

## 15-inch tiltable screen

THE VDN 52500 asynchronous display terminal offers advanced features including a tiltable 15in screen and a detachable low profile Hall Effect keyboard.

The screen can be moved in both vertical and horizontal directions.

Based around the 8085 microprocessor, the electronics are mounted on a single printed circuit board located in the base of the terminal. Up to four pages of alphanumeric characters or block graphics can be stored in the terminal's memory. All upper and

lower case characters, with specified symbols, can be displayed on the screen. The display format is 24x80 characters with a 25th status line.

Remote and keyboard commands provide full cursor and screen control, editing and form management.

Cursor commands include: left, right, up, down, etc, as well as full titration.

Aim Digital Systems (CW), 98 Crofton Park Road, Crofton Park, London SE4 1AL. Tel: 01-690 44289.

## Acoustic covers offer a quieter life

TO reduce word processor or printer noise levels — and the stress levels of everyone within earshot — Immac has announced its acoustic cover range, called The Hushcover.

This can reduce the noise level of a typical printer from around 64dB(A) to less than 50dB(A) depending on the printer make, says Immac, and represents a sound energy reduction of well over 55%.

The Hushcover, designed and tested in conjunction with ICI Acoustics, has several advanced design features such as the safety wire

ring of the printer to the fan to ensure that should the fan stop, the printer will immediately cut out and prevent overheating. The cabinet is constructed from two layers of steel and packed with glass fibre and mineral wool.

The lid is made from neutral-tinted perspex and available in two versions, either domed for automatic paper feed or low profile and slotted for continuous feed stationery. Both types of lid have acoustic seals and gas struts for easy access.

The Hushcover, styled to blend

in with most decors, is finished in chocolate and cream colours. There are three versions: the HC222 for tractor feed printers such as the Commodore 4022 or the Okl Microline 80 series costs £355; the HC333 for tractor feed printers such as IBM 5256 or the D9900 costs £445; and the HC333H for printers with hopper feed attachments such as the Xerox 880 or Quint Sprint costs £495.

Immac (UK) (CW), 2000 Park Road, Astmoor, Runcorn, Cheshire, WA7 1PZ. Tel: (0925) 67351.

The Hushcover from Immac.

The Hushcover, styled to blend

## Up to 16 memory maps can be pre-defined

MEASUREMENT Systems has announced the release of the 901 single board CPU. Based on the 2MHz 6809 8/16 bit processor, the 9000 offers state of the art board level processing for a wide variety of bus-oriented applications.

The single Eurocard size board offers user features including timer, clock, four DMA channels, memory management all running with the 2MHz 6809. The compatibility of the product with the Rockwell RAM65 bus provides wide selection of hardware boards.

The processor is capable of addressing the full 1 Mbyte offered by the 6809. The system supports multi-tasking and up to 16 memory maps can be pre-defined and switched. Additional map may be held for loading during task switching.

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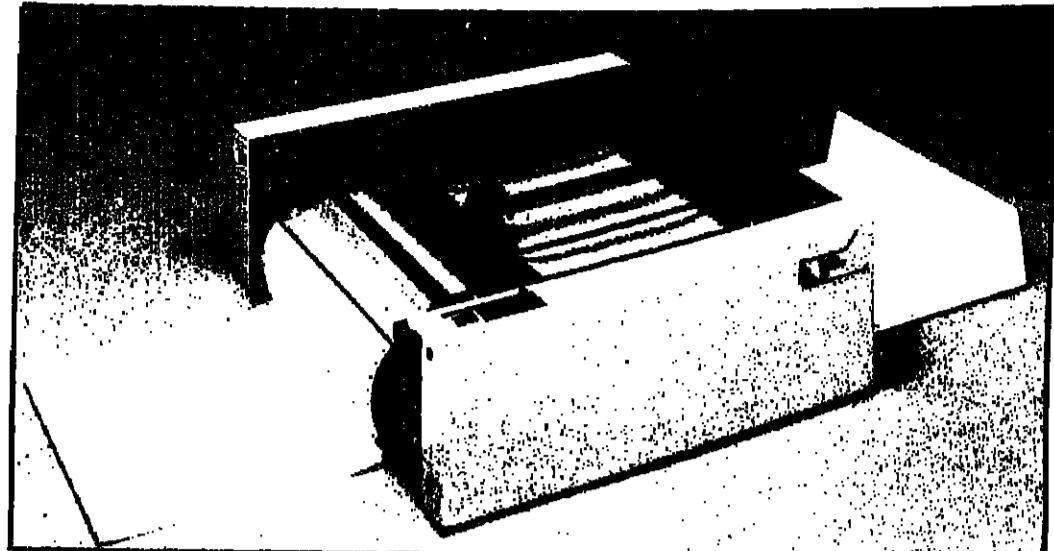
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## PRODUCTS



The Model 9030 burster from Paper Handling.

## Paper handling equipment for first-timers

WITH the release of the Model 9030 burster, Paper Handling claims it has brought forms handling equipment within the reach of many first-time users. For a cost of £1 a week (plus VAT) the machine will burst paper up to 12in deep and 16in wide at 60ft a minute. Edge trimming facilities are also available at extra cost.

The equipment is made in Britain, and will appeal to the lower volume user of continuous stationery, say the manufacturers.

Paper Handling (CW), St George's Chambers, 15 The Forum, Stevenage, Herts SG1 1BS. Tel: (0438) 725276.

## Controllers for PDP and LSI systems

MAGNETIC tape controllers for PDP-11 and LSI-11 computers have been introduced by MDB Systems. This new line is being introduced simultaneously with MDB's disc controller.

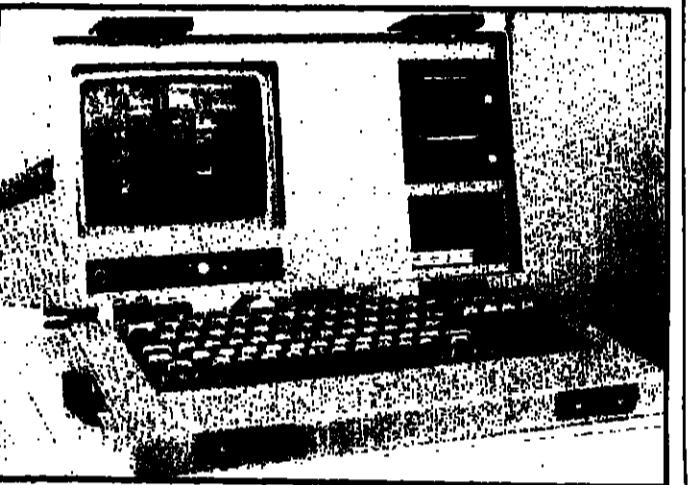
Don Perkins, MCB vice-president of engineering, describes the magnetic tape controllers as incomparably multi-featured. "They establish a new industry standard because they are system configurable through the operator console. This means that drive configurations can be changed or added without powering down the processor. Operator console select capabilities include controller addressing, bus levels, unit numbers, unit parameters and unit priority interrupts and vectoring," he said.

Designed to control any combination of nodes and speeds on four drives simultaneously, the TM-11 compatible controllers interface NRZI, PB and combined NRZI-PB drives on a single board. They are transparent to DEC operating system drivers and diagnostics, are 16, 18 and 22 bit bus compatible and have automatic self-test on board.

The controllers feature a non-volatile static RAM to handle multiple tape drive speeds, densities and Unibus address modes. They configure RAM to standard values via firmware at initial power-up.

The new MDB Q-Bus tape controller model MLSI-TM11 is priced at \$2,600. Model MDB-TM11 for Unibus is \$2,950.

MDB Systems (CW), 1995 North Batavia Street, Orange, California 92665.



The Chameleon multi-protocol simulator/analyser.

## Controlling the other end of the link

CHAMELEON is a portable protocol simulator that enables engineers developing data communications hardware or software to have a controllable "other" end of the link. Typically Chameleon would appear as a front end processor, a cluster controller or a data network, with the added advantage of total control so that abnormal situations can be exercised. It works in SNA/SDLC, HDLC, X25, BSC environments and can be user modified for hybrid protocols such as those used in military or banking communications and specifying multi-level data communications protocols.

To complement the simulation facilities, Chameleon provides monitoring capabilities. These will analyse and control user data in easy to read mnemonics in both industry standards (SDLC, X25 etc.) or user defined.

Chameleon will be marketed throughout the UK by Malden Electronics.

Malden Electronics (CW), Malden House, 579 Kingston Road, Raynes Park, London SW20 8SD. Telephone: 01-543 0077.

## Intelligent identification system

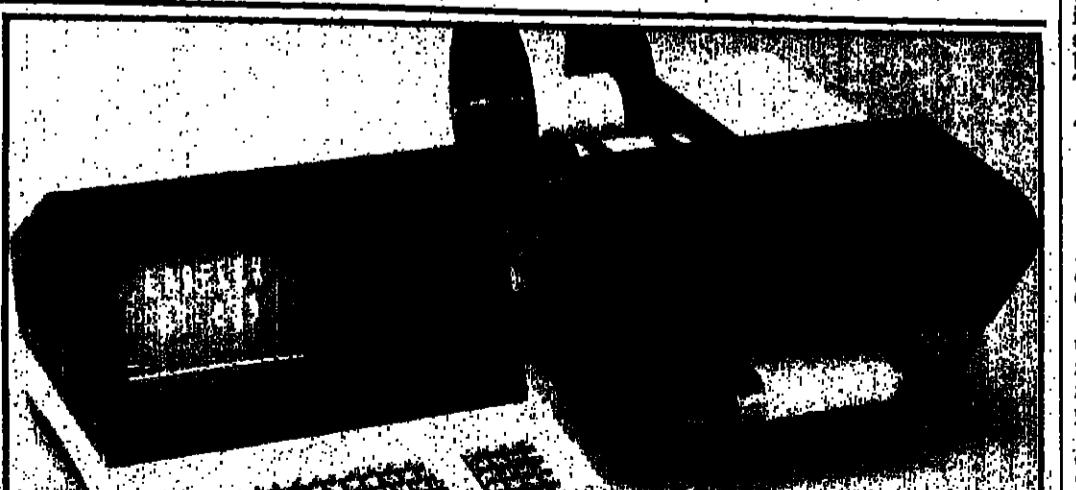
THE Labelex Model 239 identification system introduced by Weber Marking Systems offers stand-alone or computer interface capability in label production through an intelligent microcomputer driving a matrix head printer specifically designed to handle labels.

This combination, say Weber, achieves high speed programmable label production of printed labels, copying bar code and/or alphanumeric data to a format selected by the user, without the need for masters.

Interface capability includes five RS232 serial lines plus video camera input and output (optional) to implement the host computer interface. The output capability is sufficient to handle up to four compatible printers.

The Model 239 is uncomplicated in operation, with much of the composition work simplified by in-built programme memory.

Weber Marking Systems (CW), 20/21 Market Place, Watford, Herts WD1 1BS. Tel: (0923) 274471.



The microcomputer and printer which make up the Weber Labelex model 239 identification system.

Weber Marking Systems (CW), 20/21 Market Place, Watford, Herts WD1 1BS. Tel: (0923) 274471.

## New forms manager for Vax series

DIGITAL Equipment has announced a terminal oriented data management system to help managers cut down programming, development and maintenance costs for a wide range of applications. The new software - which will complement Digital's other Vax-based forms manager Vax-11 RMS - will be of interest to managers interested in developing a teleprocessing environment, says DEC.

Called Vax-11 TDMS, the new product can, it is claimed, raise programmer productivity and lower costs by replacing major portions of the application programs with easy-to-use program-independent definitions for screen formats and application program data mapping.

Vax-11 TDMS software is intended for forms, data records, and data exchange in the Vax-11 Common Data Dictionary. Most changes to these definitions can be made without affecting application program logic, resulting in easier program maintenance.

Vax-11 TDMS stores its definitions for forms, data records, and data exchange in the Vax-11 Common Data Dictionary. Most changes to these definitions can be made without affecting application program logic, resulting in easier program maintenance.

The new software is supported by Vax-11 Dataview procedures. It provides transparent application program/data mapping and conversion with existing Vax-11 RMS file services, Dataview, and Vax-11 DBMS database management record definitions.

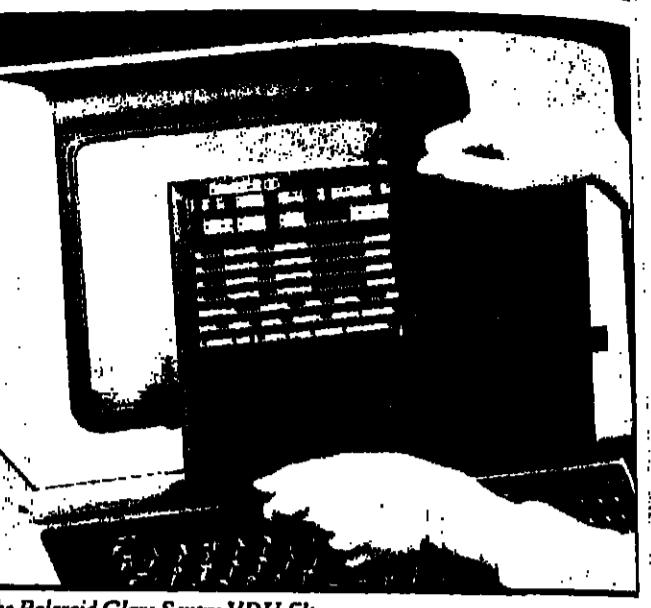
Vax-11 TDMS includes a number of new features. A screen editor defines forms, which govern the appearance of the terminal screen during execution. Definitions include cursor control, scrolled areas, explanatory and "help" text, highlights and other, video characteristics.

The screen editor can also define field validation criteria that restrict the kinds of data that a terminal operator is permitted to modify. Most field editing and data validation functions are handled by screen definitions.

TDMS incorporates a language of powerful, non-procedural expressions called Requests. These expressions specify the exchange of data between terminals and data files: a simple Request identifies a form to be displayed and the data fields to be collected and/or displayed on the form. More complex Requests may include conditional instructions and automatic handling for scrolled areas.

Chameleon will be marketed throughout the UK by Malden Electronics.

Malden Electronics (CW), Malden House, 579 Kingston Road, Raynes Park, London SW20 8SD. Telephone: 01-543 0077.



The Polaroid Glare Sentry VDU filter.

## Sentries cut glare from VDU screens

THE newly-introduced Glare Sentries from Inmac are claimed to reduce dramatically the amount of glare reflected from VDU screens which can cause eyestrain, headaches and fatigue.

The screens are manufactured from a special circular polariser from Polaroid which benefits from being cleaned by a specially formulated cleaner which it is claimed, will not scratch the surface.

Inmac's Glare Sentry cleaning solution is formulated to remove dust, grime and fingerprints without causing any damage to the surface of the filter or the VDU screen.

The solution is available in 200ml bottles for £3.50 each which includes cleaning swabs.

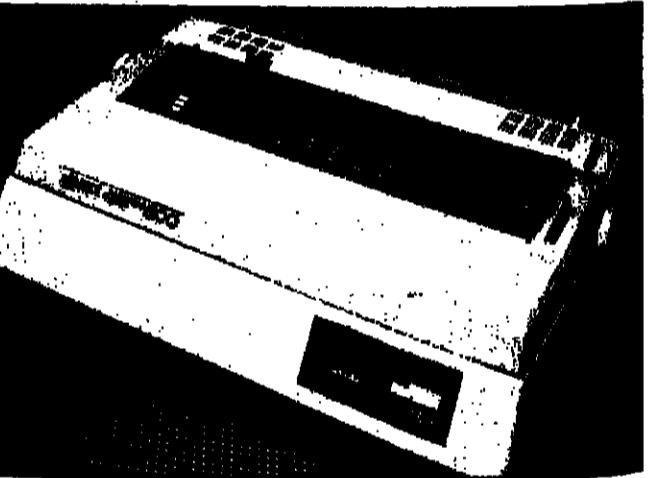
The Glare Sentry filters themselves are available for all popular makes of VDU and cost £1.65 each.

A 100ml bottle of cleaning solution is also provided at no extra cost.

Further details are given in Inmac's latest full colour catalogue, with information on over 800 other computer accessories. All products carry a guarantee of at least 12 months with a 30 day risk-free trial and a promise of next-day delivery of order.

Inmac (UK) (CW), Day Road, Asmoe, Runcorn, Cheshire WA7 1PZ. Tel: (0928) 67551.

The solution is available in



## Low-cost daisywheel

THE Juki 6100 low-cost daisywheel printer is designed for word processing use with personal and business micro. It emulates Diablo 630 protocol and is compatible for use with the Wordstar word processing package.

Features include 18 chip bidirectional logic seeking; subscripts and superscripts; bold and shadow printing; character pitches 10, 12, 15 and proportional; graphics mode; 1/12in min character spacing; 1/48in line spacing; 2K buffer memory; 100 character

Triumph Adler compatible "drop

etc.) user defined.

Micro Peripherals (CW), The Street, Basildon, Essex, UK. Tel: (0268) 3232.

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**SENIOR APPOINTMENTS - £14K +****SYSTEMS SOFTWARE****ANALYST/ PROGRAMMER**

CONTINUOUS PROCESSING

c.£15,000 AND CAR

CITY BASED

A vendor of worldwide renown has recently launched a new range of Continuous Processors in competition to TANDEM and CTL MOMENTUM.

This is an excellent ground-floor opportunity to join them while the Division is still in its formative stages.

They are seeking a young person capable of a multi-faceted role with a heavy technical content and a great deal of customer interfacing. Pre-sales involvement will include help on proposals, demonstrations and presentations. Candidates with experience in some of the areas listed below should identify well with this position:

- ★ Good real-time on-line systems software
- ★ TANDEM, DEC, PRIME or DATA GENERAL equipment
- ★ COBOL or other applications, software languages
- ★ Communications and/or database software

Please contact BOB BOWER for further information

Ref. CW2107/1

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OFFICE AUTOMATION

TO £18,000 AND CAR

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This important position has been created to complement the existing Marketing Group. It is primarily concerned with all areas of pre-sales support covering the U.K. An average of two/three days' a week will be spent out of the office with periodic trips (approximately five days every two/three months) to the Company's H.Q. in Europe.

Requirements include a good understanding of OA and current products available, for both central and distributed systems. Experience of implementing OA systems (Wang, IBM, DEC, etc.) while employed by a systems house or manufacturer is highly valued and a knowledge of OA/DP integration requirements preferred. Candidates should be educated to Degree/HND level.

Please contact BOB BOWER for further information.

Ref. CW2107/2

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SPECIALIST RECRUITMENT CONSULTANTS**SALES - IBM PLUG COMPATIBLES**  
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In this highly competitive market place, excellence of equipment and keen pricing policy are two very important factors. Our clients are a huge multinational with perhaps the largest range of information processing hardware and systems available today. A division of the Organisation specialises in IBM plug compatibles where their price/performance advantage is of great benefit. Important sales vacancies have been created in two areas:

4300 SERIES AND ABOVE

OTE £30,000+ AND CAR

To sell a range of compatible processors for database, communications and interactive applications, fully comparable with the most advanced operating systems such as VM/SI, DOS/VSE and MVS/SP using the most advanced VLSI/VSI technology.

**3270 DISPLAY SYSTEMS CONTROL UNITS DISPLAYS AND PRINTERS**  
OTE £20,000-£24,000 AND CAR

To sell a unique interactive display system using the latest micro technology, creating total flexibility including TSC, SDLC/CSNA systems.

ONLY EXPERIENCED PCM SALES EXECUTIVES NEED APPLY FOR THE FIRST CATEGORY. BRIGHT S.E.S. WITH SALES POTENTIAL MAY BE CONSIDERED FOR THE SECOND.

Contact BOB BOWER, quoting reference CW2107/3 for further information.

(400)

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...into Consultancy****Analysts  
Designers  
Team Leaders****£13,000 - £15,500  
+Car+Bonus for  
Senior Positions****London**

Technical, Sales &amp; Management Appointments

Hutton  
SPECIALIST RECRUITMENT CONSULTANTS

You have five years experience, or more mostly gained in a systems development environment.

You have worked in Banking or Insurance, on the development of on-line applications, using database.

Or, your background is in another application field in which you can offer strong competence. You are a brilliant Designer, a skilled Analyst, a successful Team Leader.

If your experience includes IBM mainframes, H.P. 3000, Tandem, Honeywell, VAX or Data General, it is a definite advantage.

You have a mature personality, sound interpersonal skills and leadership potential. You are aged 28 to 40, educated at least to 'A' level or equivalent, preferably with a degree or professional qualification. You now want more business and technical variety within a systems development environment.

You want to move into consultancy to communicate your expertise to client users.

You want to get to the top of your profession by learning the techniques and skills of a top consultancy.

Such an opportunity is open to you through the new vacancies created in the Systems Development Division of an International Consultancy. Our Client has an enviable reputation in the field of Information Systems consultancy and Training and can offer the challenge to rise to project management and consultancy.

Contact Renée Nute on 01 935 0671 or 01 874 6372 evenings and weekends, or send your C.V. to her at the London address below.

(400)

**CAD SOFTWARE ENGINEERS**

Following the highly successful launch of the Artworker CAD system for the design of printed circuits, Wayne Kerr Datum Ltd. are seeking additional Software Engineers to further strengthen the design team.

These well rewarded positions offer challenging work and excellent opportunity in an exciting market.

Applicants should apply to:

Wayne Kerr Datum Limited  
Woolborough Lane  
Crawley Industrial Estate  
Crawley, W. Sussex

Tel: 0293 543266

**Imperial College of Science and Technology****Administrative Computing Development Officer**

The College is in the process of expanding its administrative computing services in order to establish a set of unified data bases around which the software packages required by Central Administrative Sections can be expanded or developed. An important additional requirement is to develop a management information service for senior management. The College has a student population of 4,700 and a staff of 3,000.

An experienced manager is required for the development and direction of this project. Candidates should have experience in the design and use of data bases for administrative purposes. Proven success in the management of small software teams and in the development of structured, fully documented software is important.

Appointment will be made in the salary range £13,515 to £18,925 per annum plus £1,188 London Allowance.

Further particulars and application forms are available from the Personnel Secretary, Imperial College of Science and Technology, London SW7 2AZ, to whom applications should be submitted by 12 August 1983.

(400)

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**WINDSOR & MUNICH**

Kramer Westfield is a small, effective, specialist consultancy providing expertise to high technology clients. Demand for our services has resulted in the need to augment our team by the appointment of two new consultants, who will focus on the semiconductor and communications market sectors.

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If you are aged 25-35, currently in recruitment or high technology sales/engineering and would enjoy the rewards of operating within a small, close-knit team then we would like to hear from you. You will receive a high base salary, attractive bonuses, company car, private health scheme and work from prestigious new offices.

Applicants, male or female, should contact Martin Warner or Paul Child on Windsor (0753) 56155 or 04858 7403 evenings and weekends, or write to Kramer Westfield Associates Ltd., 23 Victoria Street, Windsor, Berks SL4 1HE.

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We will also have a requirement for a

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In a few weeks. Salary similar to above.

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(400)

# Systems Professionals

## Looking for your first career move?

Your first move is probably the most difficult one you'll ever make. You can't afford a mistake, but how do you know you're choosing the right company?

We are convinced we've found them. Our client believes people are their strength and their commitment to their people is wholehearted. In their purpose-built development centre, you'll find both the tools and the backing to develop your skills to their maximum potential—and you'll learn those new skills you need to become involved in projects at the very forefront of technology.

Because of their policy of continued expansion our clients are now seeking dedicated professionals in the following areas:

- Office communication systems • Data communications
- Local and wide area networks • Software tools

Applicants should have a degree in computer science, electronic engineering, or a similar discipline, and a minimum of two years' development experience in real-time applications.

For further information about these positions please contact Edith Watson at Computer Search and Selection, Hamilton House, Marlowes, Hemel Hempstead, Herts HP1 1BB. Tel: Hemel Hempstead (0442) 40761.

**Systems Programmers and Consultants**

For the development of systems tools and utilities, including the provision of a portable toolset based on the UNIX operating system. IBM or VAX background preferred, and a knowledge of 'C' or PL/M would be an advantage.

**Software Engineers**

To become part of a team currently developing office communications and networking software for Z80 based microcomputers.

**PL/1 Programmers**

To customise generic systems software for PABX applications. Knowledge of MVS essential. Experience of IMS or SPF would be an advantage.

**Team Leader, Engineering Development**

The successful applicant will be responsible for a team of up to 6 hardware engineers. You should have a minimum of 5 years' development experience and a sound appreciation of both hardware and software, particularly in INTEL or Z80 based systems.

**Hardware Engineers**

For a variety of applications up to and including the prototyping of new products. Some software knowledge would be an advantage.

**Computer Search & Selection**

# Engineering Manager

Advanced Portable Micro Computers

## Southern Based

c£15,000+Car+Benefits

A multi-million dollar turnover corporation is enjoying considerable success in North America with a product acknowledged as an industry leader. It is recognised as the world's most powerful, portable IBM P.C. compatible micro computer.

To further its worldwide growth the Corporation has recently formed a European subsidiary with exclusive distribution rights to this most advanced computer and wishes to maintain its reputation for reliability and quality control gained over many years as a responsible manufacturer, supplier and innovator of new products.

The Organisation now seeks to appoint an experienced Engineering Manager from within the micro computer/personal computing industry to assume direct responsibility for quality assurance and warranty, during a period of predicted growth, where, reporting to the European Technical Manager, the individual will organise product quality control, test, warranty, service and maintenance standards and operations.

Your background should include sound engineering

management and technical experience in micro computing where ideally you will have been directly involved in quality control, warranty costing and negotiating dealer service and maintenance contracts.

This is a rare opportunity to manage and instigate reputable standards, where future personal and career growth is considerable within such a high technology group and therefore demands dynamic and ambitious individuals.

To be considered against this new opportunity, please contact our Advising Consultant Roger Dorrington on 01-935 0671 (24 hour answering service) or submit your Curriculum Vitae to him at the London office address below.

Your application will be treated in strictest confidence and you are assured of a prompt and relevant reply.

### Technical, Sales & Management Appointments



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**SOUTH**  
James House, 46 James Street,  
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01-935 0671/488 0481

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Queensway, Birmingham B3 3JY  
021-238 3781

**NORTH**  
International House, 84 Deansgate,  
Manchester M3 2ER  
061-833 0427

**BELGIUM**  
Avenue Louise 327  
1050 Brussels  
010 322-840 7151/71

**HOLLAND**  
Wilemparkweg 92  
1071 H M Amsterdam  
010 3120-760947

### SYSTEMS MANAGER/PROGRAMMER ..... BEDS c.£8-11K+CAR

International Company situated in rural Beds. are seeking a Systems Programmer to be responsible for technical support functions. The candidates will have an extensive DEC, PDP background under RSTS/E using BASIC + some FORTRAN and MACRO experience.

### HEALTH CARE/MUMPS SALES SUPPORT ..... BEDS to £13K+CAR

Leading European Software House with offices in UK, Europe and the Middle East are seeking an A/P with experience of Health Care Systems using MUMPS on DEC Hardware. Experience of Radiology and laboratory administration is advantageous.

### IBM PROGRAMMER ..... HERTS £7-9K

Our client, a market leader is seeking an IBM Programmer with experience of DOS/VSE Batch and on-line work. Candidates will be part of a small team working primarily on stock control systems.

### SENIOR ANALYST ..... N. LONDON/S. HERTS to £15K

Successful and expanding bureau are seeking a general commercial Analyst with at least five years' solid experience of systems. Candidates will have taken at least two projects from feasibility to implementation. PRIME experience a definite advantage.

### PROGRAMMER ANALYST ..... HERTS £7-12K

A leading manufacturer of domestic products utilising twin 34s is seeking a programmer analyst with at least three years' RPG II systems 34 experience. Our client is currently reviewing its financial systems with a view to redevelopment.

### BASIC + 2 or BASIC + PROGRAMMER ..... HERTS/BUCKS c.£8K

Two enterprising installations are seeking programmers with RSTS/E experience preferably with RMS. Applicants will be working on general Commercial Systems within small teams. Company progression and benefits are excellent.

### RPG II/III PROJECT LEADER

A major international company is currently setting up a team to develop distribution and finance systems for its European divisions. They need a candidate with extensive GSD experience to be based in the UK with trips to mainland Europe.

### IDMS DATABASE ANALYST

A successful construction company working mainly in the Petrochem Industry has a requirement for an Analyst with a good knowledge of IDMS. They are running an IBM 4341 under MVS with TSO/6PF but will consider candidates from other hardware backgrounds.

### IBM ANALYST PROGRAMMER

A multinational company manufacturing and distributing office equipment is developing order processing systems on IBM mainframes. They are seeking an A/P with about three years' experience including some COBOL on IBM to work on systems from feasibility to implementation.

### ICL SENIOR PROGRAMMER

Part of a international engineering group, this company is involved in the developing distributive systems on ICL 2900s. They require an applicant with at least two years' COBOL to be involved in systems from design to commissioning.

### DEC ANALYST PROGRAMMER

This company provides turnkey systems based on DEC hardware. Due to continued expansion, they require candidates with at least three years' experience on PDP 11s or VAX to work both in-house and on customer sites.

### SENIOR CONSULTANTS IBM

A service organisation of a multinational having diverse interest working mainly on IBM mainframe systems needs a candidate with extensive DP experience including some IBM and accounts/ledgers experience. Must display excellent communications skills and have a desire to play a major role within the development division.

### MIDDX. to £20K

A major international company is currently setting up a team to develop distribution and finance systems for its European divisions. They need a candidate with extensive GSD experience to be based in the UK with trips to mainland Europe.

### MIDDX. c.£13½K

A successful construction company working mainly in the Petrochem Industry has a requirement for an Analyst with a good knowledge of IDMS. They are running an IBM 4341 under MVS with TSO/6PF but will consider candidates from other hardware backgrounds.

### MIDDX. to £11K

A multinational company manufacturing and distributing office equipment is developing order processing systems on IBM mainframes. They are seeking an A/P with about three years' experience including some COBOL on IBM to work on systems from feasibility to implementation.

### MIDDX. c.£8K

Part of a international engineering group, this company is involved in the developing distributive systems on ICL 2900s. They require an applicant with at least two years' COBOL to be involved in systems from design to commissioning.

### MIDDX. c.£12K

This company provides turnkey systems based on DEC hardware. Due to continued expansion, they require candidates with at least three years' experience on PDP 11s or VAX to work both in-house and on customer sites.

### MIDDX. c.£15K+CAR

A service organisation of a multinational having diverse interest working mainly on IBM mainframe systems needs a candidate with extensive DP experience including some IBM and accounts/ledgers experience. Must display excellent communications skills and have a desire to play a major role within the development division.

For further information contact Nick Lewis (Middx positions) or Chris Cheshire (other positions).

#### HOWLETT COMPUTER SERVICES

##### FREEPOST

Leighton Buzzard  
Beds LU7 7BR  
Telephone 0525 382655 (3 lines) or 028 872 221  
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(4747)

COMPUTER SERVICES

# SOFTWARE ENGINEERS

Dorset coast



Our buoyant mood stems from important new orders won in both UK and overseas markets for our advanced data communications and computer controlled urban traffic systems.

We now wish to recruit qualified engineers at various levels in the following areas:

PACKET SWITCHING, DATA NETWORKS, SPC, TELEX SWITCHING SYSTEMS with Distributed Processing architecture and TELETEX CONVERSION FACILITIES, a revolutionary microprocessor controlled VEHICLE IDENTIFICATION SYSTEM for a new road traffic application.

A substantial investment programme is providing the latest software facilities for the efficient design of new product systems. Engineers who join us now can expect to gain valuable experience.

We wish to make the following appointments:-

### PROJECT LEADERS

These posts will suit experienced real-time Software Design Engineers who wish to make a career move towards management. They will be involved on the technical issues from system design and specification through to acceptance testing, and exercise leadership and control over groups of software engineers.

### DESIGNERS AND ENGINEERS

There are vacancies to suit those with several years' real-time engineering software design and implementation experience.

A background in any one of the following would be an advantage but by no means essential. CORAL 66, C, PLM, ASSEMBLER, INTEL 8086/88 DEC VAX 11/780 DEC PDP 11 (RSX 11M), UNIX, X25 PROTOCOLS, NETWORK MANAGEMENT, CAD.

Salary is negotiable and a generous relocation package will assist your move to a delightful part of the Dorset coast, where housing is reasonably priced.

To apply either telephone Poole (0202) 675161 (ext. 2028) between 9am and 6.30pm until July 28th quoting reference CWP/632 or fill in the Quick Response Coupon and post to Glyn Griffiths, Plessey Controls Limited, Sopers Lane, Poole, Dorset BH17 7ER.

**OPLESSEY**

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CWP/632

Name \_\_\_\_\_ Age \_\_\_\_\_

Address \_\_\_\_\_

Tel. Day \_\_\_\_\_ Evening \_\_\_\_\_

Present job title and nature of work \_\_\_\_\_

(Continue on separate sheet if required)

Software engineering experience (years) \_\_\_\_\_

Name of present employer and present salary \_\_\_\_\_

I am interested in (posts applying for) \_\_\_\_\_

(If you wish to state)

**LUCR**

## London West Computer Recruitment

### Honeywell Analysts, Programmers

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A large data centre servicing a group of companies has requirements for staff with a minimum of 18 months' Honeywell Level 66 or DPS 8 experience to help develop a wide range of on-line database applications. Re-location assistance. Ref. 506

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### Systems Analysts

Berks to £13.5K+

A major group operation with a heavy investment in a growing IBM mainframe network seeks several analysts to help develop new marketing, manufacturing and accounting systems. A strong IBM background and experience of on-line databases is required. Excellent benefits and prospects. Re-location assistance. Ref. 734

### IBM A/Programmers

Berks £10.5-16K

The services division of a manufacturing group require analyst programmers aged 25-32 years for a support function involving client liaison and systems enhancements. Previous analysis and a minimum 2 years PL1 or Cobol experience required (IBM preferred but not essential). Excellent benefits and prospects. Ref. 737

### IBM Systems Programmers

South West to £10-14K

UK subsidiary of large US manufacturer seeks a project

leader/business analyst/programmer to develop a range of

financial and distribution systems on IBM Series 1 linked to

an IBM mainframe. Good Cobol experience is essential;

RPGII desirable. This position reports directly to MD.

Excellent prospects. Ref. 122

### Project Leader

West London to £12K

Major companies developing a variety of military applica-

tions seek hardware design engineers with broad based

experience in control systems/data logging/instrumentation/

automation or similar applications. Candidates aged 24-35

years; must have HND/HNC degrees and some software

experience. Attractive locations. Good benefits. Re-

location assistance. Ref. 750

### Design Engineers

Hants., Somerset to £12K

Major companies developing a variety of military applica-

tions seek hardware design engineers with broad based

experience in control systems/data logging/instrumentation/

automation or similar applications. Candidates aged 24-35

years; must have HND/HNC degrees and some software

experience. Attractive locations. Good benefits. Re-

location assistance. Ref. 692

### Real Time Engineers

West, South, Wales £10-£15K+

Major companies developing real time applications in

telecommunications, process control, telemetry, industrial

automation and military systems require experienced team

members and project leaders. Computer Science/Engineering

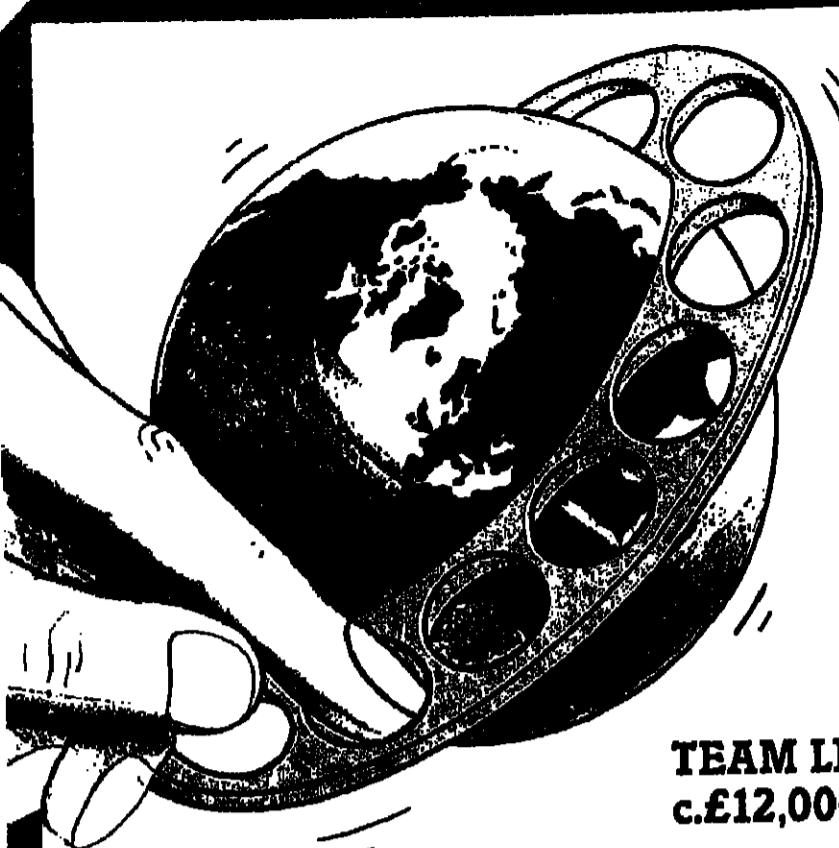
degrees essential, plus assembler and/or high level real

time language experience. Excellent benefits. Re-location

assistance. Ref. 614

Computer Weekly 21 July 1983





## 'WHEN IT COMES TO ADVANCED TELECOMM SYSTEMS — WE RUN RINGS ROUND THE REST OF THE WORLD'

TEAM LEADERS and SENIOR SOFTWARE ENGINEERS  
c.£12,000 pa — £18,000 pa

This is an opportunity to work on one of the most advanced projects in the world. The development of this integrated telephony system is the result of the collaboration of a number of countries.

The work is varied and challenging. Working within a modern environment engineers utilise rigorous design methodologies. All team leaders and senior engineers are expected to lead by example, therefore experience of the application of high level languages in a telephony environment together with a mature and responsible approach are essential.

Initial training will provide the basic product knowledge to allow you to assume the responsibilities of a

team leader or senior engineer on telephony systems software design. Thereafter, there will be many opportunities to move within the project teams or the company itself.

The company is located within commuting distance from London or the rural home counties. Working in a professional environment you will receive a competitive salary, excellent benefits package and relocation assistance where appropriate.

To discuss these positions in greater detail telephone Marc Zundel on 01 938 1804 (24 hrs) or 01 602 0685 (between 7.30 p.m. and 8.30 p.m.) or write to us with full career details.

(4724)

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Processing People  
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## SOFTWARE QUALITY ASSURANCE

To £14K

Berks

Our client, an international minicomputer manufacturer, is enjoying a dramatic growth in sales due to innovative design and exciting business plans. Continued success depends on exacting quality assurance of new software releases, and to this end we are recruiting an additional Senior Software Quality Assurance Analyst.

The successful candidate will be well versed in software quality assurance, have sound software systems and programming experience and proven interpersonal communications skills. He will also have software test plan development and execution experience with a software functional specification and design review background.

In return you will enjoy a challenging project leader position with a team of analysts, and the opportunity to grow with this continually expanding group.

For further details please telephone Keith Taylor at our Reading office (0734) 595346 or write enclosing a full C.V.

## CONTRACTS

### BUSINESS ANALYST (PRODUCTION CONTROL EXPERIENCE)

SLOUGH

### IBM SYSTEM 34 RPGII ANALYST/PROGRAMMERS

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### IBM COBOL IMS DB/DC ANALYST/PROGRAMMERS

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5656

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## EXPORT MARKETING MANAGEMENT

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This same policy underpins our plans for large-scale expansion in international markets.

We are now looking for experienced marketing executives capable of spearheading that expansion throughout continental Europe and the English-speaking world.

Research Machines' product portfolio includes the successful range of computer systems (3802, Link 4802, and Chain Network), established computer-based products for education and training, and plans for an exciting new range of computer-based instrumentation products.

As Export Manager you will take on responsibility for all aspects of marketing distribution, and sales of those products in a specific multi-national territory. Your qualifications and experience will be taken into account when the territory is defined.

Specifically your job will be to draw up, implement, and maintain the marketing plan for your territory by:

1 Researching its market potential

2 Terms of customers, competitors, products, and special requirements

3 Analysing, recommending, and

implementing methods of distribution and sales.

1 Determining the appropriate level of sales and customer support to be provided by our UK sales office;

2 Contributing to future product strategy in relation to the marketing opportunities provided by your territory.

The successful candidates for these important positions are likely to have:

1 A degree;

2 A background in product sales/marketing in computing, electronics, or manufacturing;

3 Overseas sales/marketing experience, particularly involving distributors and/or agents;

4 Proficiency in appropriate European languages;

5 Considerable personal initiative and negotiating skill, and a high degree of numeracy;

6 An interest in the educational market would also be a distinct advantage.

Salary is unlikely to be an obstacle and we offer a particularly attractive package including car, 25 days holiday, pension, life and disability insurance, plus a scheme and generous help with relocation expenses.

If you are interested in this opportunity please contact Mrs Polly Kean on Oxford (0865) 726136 or write for an application form, quoting reference: EMN/CW7.

RESEARCH MACHINES  
MICROCOMPUTER SYSTEMS

RESEARCH MACHINES LTD, 546 High Street, Chelmsford CM1 1BW. Tel: 01-465 2616. (4681)

### ADVANCED SYSTEMS (UK) LTD require SALES OR DP PROFESSIONALS FOR ACCOUNT MANAGERS (Sales)

£26K + BMW or equiv + benefits

1. THE COMPANY

Advanced Systems (UK) Ltd is part of a multi-national Corporation and leading producer of training products and services for the DP Industry with an annual growth rate in excess of 35%.

2. THE JOB

To extend and support the existing Customer Base by aggressively selling and promoting our extensive range of multimedia and computer-based training courses and related services.

3. THE PERSON

The successful candidates must be able to clearly demonstrate either:

A. A proven and successful record in executive level sales. Experience within DP or related industries would be an advantage.

B. The ability to successfully utilise extensive DP knowledge — gained whilst working as a DP professional (S/A etc.) — in a sales environment.

4. THE BENEFITS

An attractive compensation plan including a basic salary of five figures, car, expenses and benefits package.

To arrange an interview telephone:  
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Northern Office: Mr Barrie Farrow 061-228 0755  
(4708)

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## REAL-TIME SOFTWARE DESIGN & DEVELOPMENT

When you try to get a deeper perspective  
on work, does it all become a blurr?

On face value C3 offers enormous challenge. Yet do you ever get the feeling that the deeper you look, the more obscure it all becomes? Do you feel a stunning lack of satisfaction? Do you find limits not license on creative freedom? Do you find frustration not fulfillment? A lot of Software Engineers do — they never see the full picture. Never put their contribution into context.

But they do at Scicon. Because we offer total involvement — from first concept to completion. Scicon have the distinction of being one of Britain's leading systems and software companies. A fact which should lead you to two conclusions:

- 1) No company gets to the top in this ultra-competitive service industry unless they have a very special skill to sell. Ours is multi-faceted.
- 2) Clearly, there's no shortage of projects or scope at Scicon.

Flight across the creative spectrum we need agile minds to develop some of the most complex real-time defence systems in Britain today — projects currently on the drawing boards involve:

- Developing the software for BATES, a major C3 system.
- Applying database technology to defence requirements.

There is, of course much more.

We're offering you the prospect of working in our refreshing free-thinking environment, playing a decisive role in small project teams, providing a technical consultancy service both in-house and directly to clients (throughout Britain and sometimes overseas). Salaries for these positions range from £10,000-£19,500 and benefits are, quite genuinely, the best in the computer services industry.

Get a perspective on the complete project for a change. Join a company that really is committed to individual training and career development. If you have experience in two or more of the following areas, try stretching your outlook and intellect with Scicon.

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- VAX/VMS ■ Database
- Real-Time Systems
- Project Management
- Computer Graphics

If you'd like to talk about your experience and how it could match our requirements phone Bob Lomas on: 01-580 5599 during office hours or on: 01-580 9955 between 5.45pm - 9.00pm. Alternatively write with a full cv to: Sandle Walpole, Personnel, Scicon Limited, 49 Berners Street, London W1P 4AQ. Interviews can be arranged outside office hours.

Scicon

(4688)

## INTERNATIONAL TRADING COMPUTER OPERATOR

City

Our client is a subsidiary of a leading international trading group marketing an extensive range of commodities worldwide.

Major new development plans are underway, with mini computers currently in use, and the introduction of an IBM mainframe in 1984.

Our client offers a young ambitious operator, with up to a year's experience, an excellent opportunity to develop a long-term career in an international environment. A good benefits package is also offered. To apply, please telephone immediately, quoting ref: SA/1207.

Sue Armstrong,  
Key Operations Assistance Ltd,  
72 Dean Street, London W1.  
Tel: 01-439 7651.

£6,500

## SOFTWARE DEVELOPMENT

RSX 11 — MACRO

SALARY: CIRCA £10,000 WALTON-ON-THAMES

Due to the success of an exciting new project an interesting and challenging position has been created for development work associated with real time computer-based monitoring systems.

For this position we require an innovative person who can work under his/her own initiative, within a small, highly-motivated team.

Applicants must have previous DEC Macro experience and preferably possess a technical qualification to at least HNC level.

In addition to an attractive negotiable salary a range of large company benefits are offered, together with excellent career opportunities.

Please send full details, or telephone for further information to Sue Hayes at Chubb Alarms, Limited, 42-50 Hersham Road, Walton-on-Thames, Surrey KT13 1RY. Tel: Walton-on-Thames (0932) 43851/46141 Ext. 190.

(4691)

(4476)

## Rise to the challenge of Systems Development

The West Midlands Passenger Transport Executive is a leading Public Transport undertaking with a fleet of 2,000 vehicles and a total of over 8,000 employees. We have embarked upon an extensive programme of applications development, including on-line and database systems. We use an ICL 2988 running under VME 2900 and a 2960 running DME/George III. In addition, the Executive operates an ME 29 Minicomputer using TME. We are currently developing a complex telecommunications network based on Local Area Network technology designed to provide local processing facilities at sites throughout the West Midlands. The opportunity now exists for experienced computer professionals to work on projects within the development programme.

**Technical Co-ordinator** £10,393 - £12,048  
To control, co-ordinate and advise on the investigation, design and implementation of communications networks incorporating hardware and related systems. A minimum of 4 years technical experience in planning and implementing data communications networks is required, together with experience of ICL communications and RACAL equipment.

**Senior Programmer** £9,240 - £10,794  
To direct and co-ordinate a small team of programmers on the development and maintenance of a wide range of computerised systems. Additionally he/she will contribute towards the development of management information systems. A minimum of 3 years experience of COBOL and ICL hardware is essential and some experience of database applications would be useful.

**Programmers** £8,571 - £10,006  
To join a small team developing and maintaining programs for a wide variety of management and financial information systems, including Database applications. Applicants should have a minimum of 3 years experience of COBOL and ICL hardware; some knowledge of Filetab would be advantageous.

All posts are based in Central Birmingham and carry attractive fringe benefits. Job descriptions and application forms can be obtained from: Personnel Department, West Midlands Passenger Transport Executive, 18 Summer Lane, Birmingham B19 3SD. Tel: 021-622 5151 ext. 41. Closing date for receipt of applications 3 August 1983.

**West Midlands Passenger Transport Executive**



## THE ROGER PARKER ORGANISATION

### HI TECHNOLOGY APPOINTMENTS

Chief Engineers, Group Leader, Software/Hardware Designers required by International Organisation. The company is in the business of electronic control and communications, and urgently needs to fill all of the more senior positions in the areas of Research, Industrial Controls, System 'X', Neulonics, Defence Systems. Relevant experience, degree standard will be ideal. Excellent relocation package, company benefits and competitive salaries, £15,000.

### COMMERCIAL APPOINTMENTS

IBM, MVS/VM, SYSTEM PROGRAMMERS minimum three years exp. £16,000c  
PROJ. LEADER - COBOL, IMS, management exp. preferred £17,000+  
ANALYST/PROG. - COBOL, IMS/DB/DC, CLIST, ADF an advantage to £13,000  
PROGRAMMERS - PL/I, MVS, TSO, Financial to £12,500  
PROGS, COBOL, CICS, TANDEM, GUARDIAN, Banking £Neg

### OPERATIONS APPOINTMENTS

OPERATIONS ANALYST - IBM, MVS, IMS, TSO, SPF, SMF, RMP. (London) £11,000c  
OPERATOR - IBM DOS/VSE, VM, 18 months' exp. (Cheshire) £7,500c  
OPERATOR - CDC, NOS, 2 years' exp. Bureau (H. Counties) £A.A.E.  
OPERATOR - IBM MVS/JES 6-12 months' exp. (H. Counties) £6,500c  
OPERATOR IBM SYST 34, Banking (London) £6,500c

### CONTRACTS

SYSTEMS PROGRAMMER - IN DEPTH VM EXP. (London) £Neg  
PROGRAMMER - HP3000, BASIC, MPE, QUIZ (London) £Neg  
ANALYSTS (4) - Banking system, IBM background (H. Counties) £Neg

If your need is not listed above, don't worry, we have other vacancies on file.

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## Management Services

### The key to success

Our client is one of the world's leading manufacturers of high technology products. Considerable commercial success has led to sustained planned growth. An important part of future strategy involves strengthening the Management Services function, currently 25 strong, with two senior appointments. Both posts report to the Management Services Manager and require good communicators with the ability to manage and motivate.

### Technical Support Manager

Supported by a team of Technical Systems Analysts, your responsibilities would include providing technical support on communications, database design, office automation, distributed processing and hardware evaluation. This would necessitate research and evaluation into new technology and, on occasions, the provision of a programming service.

Applicants should be graduates with experience in system programming and/or database design, as well as previous management exposure.

### Application Systems Manager

Supported by a team of Systems Analysts, your responsibilities would include the planning and control of systems projects, regarding time-scales and costs, interfacing with all departments involved, and with software houses. You would also be required to manage the design and documentation function and to initiate the changes required to ensure successful implementation.

Applicants should be graduates - or hold professional qualifications - and have previous experience as a systems project manager, systems manager or O & M manager.

The salaries offered will reflect the importance of these positions and will be enhanced by an attractive package of benefits, good working conditions and, where appropriate, relocation assistance. Career opportunities within our progressive organisation are exceptional.

Please apply with full personal and career details to Confidential Reply Service, Ref: BBM 8771, Austin Knight Limited, London W1A 1DS.

Applications are forwarded to the client concerned, therefore companies in which you are not interested should be listed in a covering letter.

**Austin Knight Advertising**

### RPG II PROGRAMMER

required for a three month temporary assignment. Applicants should have practical experience of work on IBM 3270 equipment. Employment will be considered on whole or part-day basis.

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Telephone: 061-789 7300 (4708)

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If you have solid experience of programming in a Database environment you could help create a new database support team in Central London. Very competitive salary and company benefits in an expanding environment

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## D.P. MANAGER

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Applicants, aged between 25 and 35, should have a sound DP background with knowledge of Cobol and accounting systems. Any exposure to Wang, Datacoms or Word Processing would be of special interest. The successful candidate will be a highly motivated person who can respond to the company's emphasis on speed and quality of service, and who has the ability to plan and develop future DP and WP applications.

As well as an excellent starting salary, our client offers BUPA, pension scheme, 22 days' holiday and modern air conditioned offices which boast swimming pool, squash and badminton courts, sauna, restaurant and bar. If you are self-motivated and would enjoy working in a dynamic environment, contact Mike Harmer for further details.

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**SALES SUPPORT (Medical Systems)** £ Neg. (Bucks)

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For more details contact JOHN GRAHAM (Evenings and weekends phone: 06285 21922)

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PRIME is recognised as one of the most successful companies in the super mini computer industry with an outstanding growth record and high profitability.

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Large commercial distributed data processing;

Or you are a pre sales systems analyst with sound experience in any of the above areas and genuinely seeking a move into sales then we would like to hear from you.

Our training, including three weeks in the United States and thereafter ongoing, is the envy of the industry and will equip you with the necessary technical expertise and product knowledge to ensure a highly successful career. An on-target income between £22,000 - £27,000 per annum includes a high base salary with excellent guarantees and a commission structure based on realistic and achievable quotas with unlimited earnings potential. A two litre car is provided and a wide range of benefits.

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ME 29 TME/TP/COBOL DESIGNERS

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SYSTEM 25 COBOL/IAS ANALYST/PROGRAMMERS

SYSTEM 25 ASSEMBLER PROGRAMMERS

TECHNICAL AUTHORS - URGENT

**IBM**

DOS VSE CPG PROGRAMMERS

OS CICS COBOL PROGRAMMERS

SYSTEM 38 RPG 111 VARIOUS - URGENT

MVS COBOL TO VWRITE SPF PROCEDURES - PROGRAMMERS

SYSTEM 34 RPG 111 WITH COBOL - PROGRAMMERS

SYSTEM 34 TO 38 CONVERSION - PROGRAMMERS

VM/CMS - SYSTEM PROGRAMMERS

MVS COBOL - PROJECT LEADERS

MK IV - ANALYST PROGRAMMERS

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(4688)

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Come on you PL/I experts -  
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Our clients, predominantly major City institutions, are regularly calling upon us to provide freelance PL/I programming support, but there is a limit to what we can do without first finding more of you.

If you are proficient in the use of PL/I, that will be a tremendous start; if you practice JSP techniques, so much the better; if you have experience of IMS DB/DC, you have hit the jackpot!

Working conditions are excellent; the environments are friendly; contracts, both long and short, are available for a start anytime over the next 6-8 weeks, but the sooner the better; rates are very attractive.

Don't delay - send your CV or telephone Barrie Frost as soon as you can.

**ACR** Allmand Computer Resources Ltd  
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LEVEL 66 DM ANALYST PROGRAMMERS

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DEC PDP11 RSTSE RMS BASIC +2 PROGRAMMERS

DEC POP11 PASCAL PROGRAMMERS

TANDEM COBOL PROGRAMMERS

8086 INTEL MDS ICE86 ASSEMBLER ASM PROGRAMMERS

**OVERSEAS**

UNIX C PROGRAMMERS, DESIGNERS - NEW JERSEY - USA

SYSTEM 38 RPG111 - GENEVA - SWITZERLAND

WANG SNA - SOFTWARE ENGINEERS - BOSTON - USA

ADF CONSULTANT - BRUSSELS - BELGIUM

SEL 32 MPX SYSTEMS PROGRAMMERS + PROGRAMMERS - BRUSSELS

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SEL 32 HARDWARE ENGINEER - JO'BERG - SOUTH AFRICA

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## digital

Our client, DIGITAL, are currently expanding their personal support group to provide customer support in the following application areas

- Computer Tools (operating systems, languages, application generators)
- Communications
- Integrated accounting
- Financial tools

In line with this expansion, DIGITAL wish to recruit a number of APPLICATION SUPPORT SPECIALISTS experienced in these areas.

In addition to your professional skills, you must possess certain attributes which will ensure success in this demanding area. Diagnostic ability, excellent communications skills, both written and spoken, self-motivation and the ability to function effectively and calmly under pressure.

The role of Applications Support is broadly-based within the organisation. It involves customer liaison, to provide both pre and post-sales user support; the analysis and evaluation of product quality, supplying management information about market penetration and systems performance. A further development of your responsibilities would be training internal sales personnel.

For the right man or woman, with a comprehensive knowledge of applications this is an excellent opportunity for career development in a growth industry, with an internationally successful and stable organisation.

A competitive salary is offered together with a full range of generous fringe benefits normally associated with an internationally successful organisation.

To apply, please contact George Shaw on 01-549 9236 (24-hour answering service)

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NATIONAL COMPUTER SUPPLIES

A Division of Visionhire Communications

Require self-motivated sales people in the Notts, Derby and West Midlands regions. The positions would require selling nationally known products into existing accounts and the penetration of new accounts

It is unlikely that applicants below the age of 25 would have the necessary experience. Ideally candidates would have three years' experience in this or a related industry.

Remuneration would be by way of an attractive basic salary plus commission

A company car and other benefits would apply commensurate with a large organisation

Write with full details of career and salary history to:

Regional Manager

NATIONAL COMPUTER SUPPLIES

Unit H, 3 Tadman Street, Wakefield, West Yorkshire

(4726)

## SENIOR ANALYST/PROGRAMMER

Based in Warrington, Cheshire, the company seeks to appoint an experienced person to control the development of its Software located on its PRIME 560/2. The successful candidate will be experienced in FORTRAN and will have a strong background in Systems Analysis.

Applicants will need to show the ability to work with minimum supervision.

Salary negotiable.

Applications together with cv to:  
Mr K. L. Waters, W. Waters & Son (Trade Protection) Limited, Bladen House, Haydock Street, WARRINGTON, WA2 7UW.

(4673)

## Systems Programmer

Nottingham Salary £8,108-£11,295 p.a.  
East Midland Electricity operate a 16 megabyte 3083B and a 12 megabyte 3033N IBM Computer using the MVS/SP 1.3 Operating System. Other software includes CICS for teleprocessing, TSO for program development and personal computing, and the IMS/DLI database management system. A network of over 350 terminals is supported.

The successful applicant will be required to work in a small team specialising in the implementation and tuning of manufacturers' software and the design and development of utility routines and programs. Sound and proven ability in Assembler and/or COBOL languages is required. Some knowledge of IBM Operating Systems and Utility software would be an advantage. Initial salary will be based on experience and will be supported by attractive fringe benefits.

Application forms, obtainable from the Personnel Manager, E.M.E., PO Box 4, North P.O.C., 388 Coprice Road, Arnold, Nottingham NG6 7HX should be returned by 4th August 1983 quoting vacancy number EM/84/83.

(4676)

## WORK ELECTRIC

### DISABLED LIVING FOUNDATION Analyst/Programmer

An exciting and prestigious post in a national information service on disability.

Applications are invited for a new post with the Disabled Living Foundation's Information Service for one year with possibility of extension.

The duties of the post will be concerned with the start up and development of a computer-based PDP 11/23 information storage and on-line retrieval system where knowledge of databases will be relevant. A secondary task will be to extend the use of the computer in administration of the Foundation's work. The project has attracted funds from the Department of Industry.

Salary: £9,000-£10,000.

Application form and further information from: The Director, Disabled Living Foundation, 348 Kensington High Street, London W14 8NS. Telephone: 01-802 2491.

(4723)

## JUNIOR PROGRAMMER N.E. Surrey

Substantial group of Timber and Builders' Merchants require an Assembler Programmer to strengthen their ICL System 25 development team. Previous experience of System 10 or System 25 would be an advantage.

The position carries a salary of up to £6,750 dependent on age and experience and 21 days' holiday plus bonuses.

Please apply in writing with C.V. to:

D. Lillard, Group Data Processing Manager

Sabah Timber South East

(Merchants) Ltd

Xylon House, 1 Central Road

Worcester Park, Surrey KT4 8DN

(4746)

# SYSTEMS & PROGRAMMING

## CONTRACT REQUIREMENTS

IBM MVS, COBOL - ANALYST/PROGRAMMER

- SOUTH COAST

IBM MVS, COBOL - PROGRAMMER

- SOUTH COAST

IBM MVS, COBOL - TEAM LEADER

- SOUTH COAST

IBM SYSTEM 38, RPG 3 - PROGRAMMER

- LONDON

IBM DOS/VSE, PL/1, DL/1 - PROGRAMMERS

- SURREY

IBM SYSTEM 38, MAAPICS - PROGRAMMER

- LONDON

NIXDORF BASIC - ANALYST/PROGRAMMERS

- MANCHESTER

BURROUGHS 6900 GEMCOS, DMSII, COBOL - PROGRAMMERS

- HERTS

ME29 TME, COBOL, IDMS - ANALYST/PROGRAMMER

- LONDON

ME29 TME, COBOL, IDMS - PROGRAMMER

- LONDON

ME29 TME, IDMS - DESIGNER

- LONDON

ICL SYSTEM 25 - ANALYST

- MIDDLESEX

ICL VME, COBOL, IDMS, TPMS - SYSTEMS TESTERS

- MANCHESTER

ICL 2900 VME/B, COBOL, TPMS, IDMS - DESIGNER

- LONDON

ICL 2900 VME/B, COBOL, TPMS, IDMS - PROGRAMMER

- LONDON

ICL 2900 VME/B - PROGRAMMER

- SURREY

ICL 2900 IDMS - ANALYST

- LONDON

ICL 2900 VME/B, COBOL, IDMS - ANALYST/PROGRAMMER

- LONDON

ICL 2900 VME/B, COBOL, IDMS - PROGRAMMER

- LONDON

MICROWAVE ENGINEERS URGENTLY REQUIRED

Contact Heather or Lynne on 01-948 5922 (working hours)

## Systems Programmers Trainee Systems Programmers

SOUTH COAST

above average salaries

- MVS/SP - migrating to XA in 1984/85
- SNA
- CICS & DL/1 - one of the biggest installations in the UK and still growing fast
- IBM 3083 and 3032 installed, 3081 in 1984

In support of these and other developments, we wish to recruit additional staff in the Technical Group as follows:

### Systems Programmers

Applicants should ideally have 2 years' systems programming experience using MVS, VTAM, CICS or DL/1. Ref P50.

### Trainee Systems Programmers

Applications are invited from Applications Programmers with at least 2 years' experience who wish to move into Systems Programming. Or, from graduates with a good degree in Computer Science or a related subject. Ref P51.

Excellent conditions and benefits include substantial assistance with relocation expenses where appropriate.

Please write to The Senior Personnel Officer, Southern Gas, 80 St. Mary's Road, Southampton for an information package, or ring us anytime on Southampton (0703) 31818. Please quote the appropriate reference number when applying.

**SOUTHERN GAS**



The World's largest and oldest established independent leasing company specialising in sales and leasing programmes for the high technology office products market.

### AREA SALES MANAGERS

London

TARGET EARNINGS £20K +  
5 Figure Basic + Car & Benefits

The requirement is for proven sales professionals with excellent track records gained selling high tech office products. Knowledge of leasing is not important as full training will be given. More important is the fact that you can relate the FABs of our programmes to the needs of the OP market place. Our no calling incentive plan will enable you to earn a substantial income for above target performance with the benefit of

real career development in the future. There will be vacancies in other areas in the near future.

Please send career details in total confidence to:

P.E. HOLD, ESQ  
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U.S. LEASING LIMITED,  
314 REGENTS PARK ROAD,  
LONDON NW1 2JX.

(3184)

## Pioneer Appointment Systems Manager

Saudi Arabia

c.£20,000

This key appointment is for a Jeddah based manufacturing joint venture between a prestigious Saudi group and a leading US company. A Computer Systems department is to be established and a systems specialist is required to undertake its development.

Reporting to the Operations Manager, prime responsibilities will include the installation of hardware and software environments, day-to-day systems performance, feasibility studies, project planning, programming, and the training of users.

Candidates must have worked as a leader on a major development project, and must have proven working experience of at least two different hardware installations and several computer languages.

Attractive tax free salary for discussion. Other benefits include free furnished accommodation, car, renewable married or single status contract, and UK leave with paid airfares.

Please write - in confidence - giving full career and personal details to M. J. Lebbell, ref: FY1190-1.

**MSL middle east**

Management Selection Limited  
International Management Consultants  
52 Grosvenor Gardens London SW1W 0AW



### CONSULTING APPLICATIONS MANAGER

An experienced manager is required to manage a small group of multi-disciplined CAD/CAM Specialists.

The successful candidate is likely to have gained considerable experience as a practising mechanical engineer before moving into the area of computing and will now be involved in the application of CAD/CAM to a wide range of mechanical processes.

Preferred age group 35-45.

This position qualifies for a company car, and the usual benefits associated with a position at this level.

### CAD APPLICATIONS SPECIALISTS

Application Specialists at both senior and junior level are required for our consulting and applications group. These staff provide technical support to our customers and sales teams. Their responsibilities include acting as a focal point for technical information between our parent in the USA and Europe, together with the provision of market intelligence and liaison with Marketing/Research and Development in the U.S.A.

We are particularly interested in hearing from experienced CAD application engineers operating in the following areas:

- (1) Integrated circuit design.
- (2) Printed circuit board layout.
- (3) Mechanical engineering design (finite element analysis, surfaces and solids).
- (4) Petro chemical applications such as piping, and three-dimensional schematics.

A generous salary and excellent conditions of work will be available to the successful applicants.

Please contact: Mr W. D. N. Davies, Calma Company, Beech House, 373/399 London Road, Camberley, Surrey GU15 2HR. Telephone: (0276) 682021

## COMPUTERS

### Exceptional Growth Company

Future Computers Limited is a new British company dedicated to the design and manufacture of leading micro computer systems aimed at the business market. Future Computers is backed by a consortium lead by the British Technology Group and the APA Venture Capital Fund.

The philosophy of the Company has been to create an advanced family of 16 and 32 bit computers using the best of design and technology with features to satisfy known and future needs in industry and commerce, and still priced to compete in world markets. The introduction of the Future computer range offers the business user a wider choice of planned options than has ever before been available from a micro computer manufacturer.

Starting with a powerful stand-alone micro computer, the range can grow simply and cheaply to become a fully integrated electronic office, with multi-user, multi-tasking networks and micro to mainframe communications. The 'future evolution' concept allows any size of business from the High Street to Wall Street to enter the range at a performance level to suit its needs, and grow from that point.

### Senior Analyst - Systems Software

To £14,500

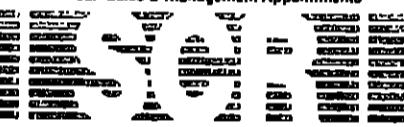
If you can claim two out of the following we would like to talk to you:

1. Five years experience in micro/minicomputers.
2. Communications experience.
3. Responsibility for planning software development in overall design structure.
4. Knowledge of operating systems.

The successful candidates will become responsible for state-of-art developments in the following areas: INTEL 186/286; ETHERNET and other local area networks; colour graphics; Winchester controllers; CPM/86; MSDOS; UNIX.

For an informal interview or to obtain further information please call Ian Goldsmith on 01-935 0671 during office hours; alternatively send your confidential resume to the London address below.

Technical Sales & Management Appointments



Specialist Computer Recruitment Ltd

**SOUTH**  
James House, 46 James Street,  
London W1M 5HS  
01-935 0671/468 0461

**MIDLANDS & INTERNATIONAL**  
35-37 Great Charles Street,  
Queensway, Birmingham B3 3JY  
021-236 3781

**NORTH**  
International House, 84 Deansgate,  
Manchester M3 2ER  
061-833 0427

**BELGIUM**  
Avenue Louise 327,  
Box 4, 1050 Brussels  
010 322-840 7151/71

**HOLLAND**  
Willemsparkweg 92,  
1013 H Amsterdam

### SALES EXECUTIVE

required for Codex (U.K.) Limited

Now well established as a permanent feature of Britain's data communications scene, Codex (U.K.) Limited is expanding its sales team and require a TEST EQUIPMENT SALES EXECUTIVE.

The successful applicant should be qualified to at least HNC OR HND level and have experience of using high technology test equipment, preferably in the data communications field.

The position based at Manchester, will involve selling data communications test equipment in Scotland, the North of England and the Midlands.

We are offering an attractive salary plus the use of company car. Other benefits include life assurance, private health plan, pension scheme, all non-contributory, 20 days' annual holiday.

Please telephone for application form:  
Miss S. J. Sewerin, Sec/pa to managing Director, Codex (U.K.) Limited  
01-889 2101

(4734)

### TECHNICAL AUTHOR COMPUTER SOFTWARE

Circ. £13K

BERKS.

Our client, an international minicomputer manufacturer, is seeking to employ a Technical Author for their "state of the art" product range. These include; a high performance transaction processor, database management system, computer networking packages, systems resilience software and some related application packages.

Responsibilities will include reviewing the technical function specifications of new software products with the development teams, writing end user overview and operation manuals for the products, and reviewing these manuals with selected management.

Ideally applicants will have:

- Minimum 5 years experience in technical authorship and/or software systems and programming.
- Proven interpersonal communications skills.
- Excellent command of written English.

In return you will enjoy an interesting position with one of the world's most prominent mini computer manufacturers.

For further details, please phone Keith Taylor at our Reading Office, or write enclosing a full C.V.

### SOFTWARE ENGINEERS

LONDON, HOME COUNTIES, PROVINCES

£14K+BUFA++ Seven software engineers sought for NEW micro projects in control/medical applications.

£10K+++. New, turn key house, ground floor opportunity for bright young commercially orientated engineer to join friendly company.

£20K+car++. Leading CAD/CAM manufacturer, 32 bit machines, offers superb opportunity to expand into marketing using your software skills.

£20K+car+++. Senior marketing opportunity for ambitious software engineer seeking career development in commercial software.

Call Clinton on 01-543 4844

(4734)

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(Agy)**

**MC/** McCOURT COUSINS LTD.

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Reading, Berkshire,  
Telephone (0734) 595346 (24 hours)

Chesham House, 150 Regent Street,  
London W1R 5FA  
Telephone 01-439 6288

## Extend Your Skills to Europe...

... and a better way of life

We are looking for a skilled IBM Systems Programmer whose technical experience will include two of the following:-

\* DOS/VS(E) \* VM \* CICS \* DL/1

### Senior Systems Programmer

#### Database

#### Teleprocessing

£15,000-£20,000

#### WESTERN GERMANY

Technical Sales & Management Appointments



Specialist Computer Recruitment Ltd

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James House, 46 James Street,  
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01-938 0671/488 0481

MIDLANDS & INTERNATIONAL  
35-37 Great Charles Street,  
Queensway, Birmingham B3 3JY  
021-236 3781

NORTH  
International House, 84 Deansgate,  
Manchester M3 2ER  
061-833 0427

BELGIUM  
Avenue Louise 327,  
Boite 4, 1050 Bruxelles  
010 322-640 7151/71

HOLLAND  
Willemsparkweg 92,  
1071 H.M. Amsterdam  
010 3120-760847



## Senior Programmer COBOL

Benefits package £20,900 net of tax\* BAHRAIN

to make a significant contribution within a 3 year contract to the company's established Central Computer Department. Set up in 1974, and now employing some 30 staff, the department is involved in the development of on-line systems on an IBM 4331.

Candidates should have a minimum of 3 years' COBOL experience plus a knowledge of VSAM, ICCP/CMS, CICS or MANTIS.

Salary, at present totally tax-free and freely transferable, will be negotiable in five-figure range.

In addition, substantial benefits include: \* 32 working days' annual leave plus 12 days of public holidays \* rent free furnished air-conditioned accommodation \* full recruitment and repatriation expenses \* annual return air fares for employees and family \* assisted education for children \* free medical care and life assurance.

\* Benefits calculated at current exchange rates.

Bahrain is a stable country with a liberal government. English is widely spoken and the company is experienced in the rapid and smooth entry of expatriate staff into the local community. Extensive sports and social facilities exist.

Please write with full details to: K.W. Rowe,  
Alba Smelter Services Ltd, Standbrook House,  
2-8 Old Bond Street, London W1X 3TB.

## BUSINESS SYSTEMS MANAGEMENT (Manufacturing)

£13,500 (BASIC\*) S. E. ENGLAND

Our client, an international blue chip electronics corporation, has always been ahead of the field in the provision of sophisticated business systems and information technology. Recently established and equipped to cope with continuing expansion, the Business Systems function provides an on-going service to all operational activities. Increasing work load has created a need for an ambitious man or woman for a key post as Project Leader. Engaged on the development and installation of on-line package systems, the suitable job-holder will:-

- possess a degree or equivalent qualification in a relevant subject, plus more than 3 years E.D.P. experience in a Manufacturing environment
- be an effective communicator, able to direct and control a small team and deal with top level user management
- maintain close liaison with colleagues in order to analyse and verify user requirements, identify problems, advise on techniques, prepare formal proposals, test and implement approved systems
- have experience of systems operating on HP3000, DEC/VAX or similar and the use of Cobol, Basic, Fortran languages.

The systems network is extensive, the work exciting and career prospects exceptional. \*In addition to basic salary, extra project hours are paid when worked. Conditions, benefits and relocation are excellent. Apply in strictest confidence quoting Ref. R/25.



### Michael Quest Associates

(Computer Management Selection Division),  
596 Chiswick High Road,  
London W4 5RS. Tel: 01-995 3246/7.

# FREELANCE

Highly competitive rates for programmers and analyst/programmers. Register now.

### IBM

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DOS, COBOL  
COBOL, CICS, VSAM  
COBOL, MARK IV, IMS  
PL/I  
PL/I, IMS, DB/DC  
DOS, COBOL, ADABAS  
System 38, RPG 111

South Coast  
London  
Herts  
London  
Surrey  
London  
Herts  
Surrey

3 months  
3 months  
3 months  
4-6 months  
3 months  
3 months  
1 year  
3 months

### ICL

VME/B, COBOL  
VME/B, COBOL, IDMS/TP

London/Gloucester  
UK/Europe

3 months  
1 year

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Siemens, COBOL  
Micro, Coral 66  
Vantek, Database  
Database Administrator (VMS II, ADABAS)  
Honeywell level 6, Assembler/Screenwrite  
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1 year  
6 months  
3 months  
6 months  
3-6 months  
3-6 months  
3-6 months

Contact Lauren Crowe

**MARCOL** 01-402 9355

Computer Systems

49 Queen's Gardens, London W.2.

## Real-Time Software Professionals

To £15,000 p.a.

Attractive south coast location

Genuine career progression, improved technical skills and an excellent rewards package — those are just some of the prospects awaiting talented Software Engineers with our client, one of the world leaders in the field of non-defence, advanced electronics and data communications technology.

The company's success is reflected not only in bulging order books but also in an expansion programme which dictates that they appoint additional real-time software professionals at all levels — from Programmers to Project Managers.

Working at the very forefront of new technology, you will join a small team environment. Projects are carried out on a range of mini and microcomputers. Both high and low level languages are utilised and you may have the opportunity of working in 'C' under UNIX.

This is a highly stimulating and demanding environment calling for people of graduate calibre or equivalent who can offer a minimum of two years' real-time development. Some communications experience would also be advantageous.

These posts enjoy the considerable advantage of an extremely attractive semi-rural, south coast location with reasonably priced housing and first-class amenities. In addition, there is a substantial rewards package, comprising a high basic salary and generous allowances for convenient daytime shifts. Enhanced earnings through voluntary, paid overtime, are also available. A comprehensive range of benefits is included together with a valuable relocation package.

Interested men or women should contact Patrick Convey quoting reference no. CW/321.

18th Floor, The Rotunda, New Street, Birmingham B2 4PA  
Tel: 021-632 6848 (24 Hours)



If systems development is your strength and IBM System 38 your experience, you're our kind of Programmer

c.£9,000

Epsom, Surrey

Durst UK, based in Epsom, Surrey, part of an international group designing, manufacturing and marketing photographic processing, printing and enlarging equipment throughout the world.

The company's total commitment to Data Processing extends into many internal functions and is highlighted by the development of a totally interactive system, advanced process control, as well as office automation, based on the IBM System 38 model 7 using RPGIII. It is interesting to record that the company's development of computer applications has made the installation an IBM reference site.

For young computer professionals looking to make their mark in a small team environment and develop a career in systems development, this is an ideal opportunity to become involved in new projects. This will involve working closely with users and management teams identifying their needs and developing and implementing new systems.

The need is for a graduate-calibre Programmer ideally aged early — mid 20s, who has 6-8 months' experience of System 38 and good communicative and interpersonal skills. You should also be hard-working, a good team member and ambitious to develop into a broader role involving systems analysis.

We'll offer a salary negotiable up to £9,000 pa plus the benefits to be expected from a successful international company.

If you have the ability and enthusiasm to work in a career-stretching role where your knowledge and talents are constantly challenged, we'd like to hear from you.

Please write giving details of your career to date to: J. D. O'Mahony, Personnel Manager, DURST (UK) LIMITED, Longmead Industrial Estate, Felstead Road, Epsom, Surrey KT19 7AR. Tel: Epsom 26282.



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10 Grenville Place, London SW7 4RW

Telephone 01-373 3063

## Systems Designers/Progs

S. Home Counties: Salaries to £15K

A series of newly won contracts, gained by a rapidly expanding Systems and Software House, has given rise to a number of vacancies for Systems Designers. Ideally, applicants should be between 26 and 32 years old and hold at least one degree in Computer Science or a numerate subject. Industrial experience must have been gained in a real-time environment and candidates should have participated in the design and implementation of these fields will be welcomed. Ref: L/16/A

## VAX/Fortran Programmers

Central London: Salaries to £12K

An international Publishing House has recently established a subsidiary to develop and market Information and Bibliographic Databases. The Company now has an immediate requirement for both Programmers and Designers to join its Headquarters organisation. Applicants, aged 23-30 years must hold a numerate degree and preferably a higher qualification in Information Science. Ref: L/16/B

## Recent Graduate? Interested in Comms?

Central London: Salaries to £10K + Benefits

A leading Systems House/Consultancy has retained Logistix to assist with the recruitment of several Designers and Programmers to form new project teams in the field of communications systems development. Projects are currently being undertaken for clients in the UK, France, Benelux and Switzerland, so opportunities for travel will arise. The applications involve the design of communication networks, network gateways, message switching systems and interfaces to Telex. Clients range from large commercial organisations to communications service providers.

**SOFTWARE DESIGNERS/PROGRAMMERS:** With a good numerate degree and at least two years' experience in industry, you will ideally have some knowledge of a proprietary networking system, e.g. SNA or DECNET and communications protocols. You should have experience with block structured languages and, ideally, also an Assembler.

**GRADUATE PROGRAMMERS:** With a good numerate degree and at least six months' experience in industry, you will probably be making your first move. Some knowledge of communications would be useful but more important is a desire to gain experience in a technically demanding environment. Knowledge of a language such as PASCAL or 'C' is desirable.

The Company is recognised as a market leader in innovative software development, particularly in communications and provides a well-defined career path for the technically motivated individual who also wants to work in a friendly atmosphere.

**BENEFITS:** The Company offers an excellent benefits package consisting of health and medical schemes.

**APPLICATIONS:** Please submit a well documented résumé or alternatively telephone one of our Consultants quoting Ref: LJS/2.

## C & Unix Programmers

London: Salaries to £10K

A highly respected Product Supplier is currently seeking to recruit several Systems and Applications Programmers to work on its UNIX-based range of products. Applicants, aged 22-26 years, should have graduated since 1980 with a good class honours degree in a numerate subject and have at least one year's commercial or industrial experience. Very recent M.Sc. or Ph.D. candidates are also encouraged to apply, particularly if their chosen subject matter was directly concerned with UNIX systems software. It is advantageous to be fluent in 'C' programming language and also offer PASCAL as a secondary language. Ref: L/16/C

## Technical Authors

Italy: Salaries to £11K + Overseas Allowance

An internationally renowned Systems and Software House is currently seeking additional Technical Authors for permanent career positions in Italy. Suitable applicants should have a good educational background and at least 18 months' experience in the design and writing of User documentation for either a software or hardware product. A good command of the English language is essential. Ref: L/16/D

## Real-Time Programmers

Central London: Salaries to £9.5K

A leading Systems House and Consultancy is currently seeking to recruit additional Real-Time Programmers for its Central London Head Office. Suitable candidates should hold a numerate degree and have at least 12 months' subsequent software programming experience in an industrial environment. Your programming skills should preferably include fluency in one or more of the following: PASCAL, C, FORTRAN, COBOL, 6800 or Assembler. Ref: L/16/E

## Senior Analyst/Programmers Holland

To join our existing team in The Netherlands developing a dynamic real-time, on-line database and communications system for an international oil and shipping concern. A sound knowledge of IBM System 38 is required together with RPG III.

Due to the continued expansion of the data processing facilities to incorporate the total world-wide organisation this will enable successful candidates to become involved with a major communications network from its inception.

Ref: 01/08

## Software Engineers/Project Leaders Herts

As one of the UK's leading communication equipment manufacturers our client is seeking to enhance its Software Tools Development team. Although mainframe based these tools are intended for use by teams working on new micro-computer development systems. The software tools section are responsible for the design, development and support to both in-house and client users.

Successful applicants will have a minimum of 3 years real-time or communications experience, proven involvement in software tools development and/or support preferably with knowledge of UNIX and 'C'. Excellent salaries plus benefits package is offered. Ref: 01/06

## Telecoms Development Essex

All candidates must offer fluency in FORTRAN preferably gained in a real-time PDP-11 or VAX environment. Experience of information retrieval and file handling is of considerable advantage for certain positions whilst Designers should have participated in the design and implementation of an on-line database system. Ref: L/16/B

Ref: 01/07

## Hardware Development Engineers Herts

To develop hardware for a new range of mini- and micro-based hardware for Electronic Mail, Office Automation, Networking and Telecommunications systems. Good design ability is a necessity with a willingness to work in a team environment. Full training will be given where required.

Previous development experience on ZILOG, INTEL or MOTOROLA hardware is advantageous plus the ability to understand the software requirements generated by the hardware development. The company's rapid growth means excellent promotion prospects. The number and variance of current and new projects together with the most up-to-date laboratory facilities make this an opportunity not to be missed. Ref: 01/08

## Lecturers London

To join an organisation specialising in the presentation of Programming and Systems Analysis courses to DP personnel. Courses are mainly aimed at the commercial skills i.e. COBOL programming and the design of sophisticated business systems.

Candidates should have a sound programming and/or analysis background with the desire to instruct. Full training in the preparation and presentation of courses will be given as well as the opportunity to be trained in new languages, techniques, etc. These positions offer both challenge and reward. Ref: 01/09

## Technical Authors UK & Overseas

Hardware and Software authors for a large number of clients on projects covering the following topics:

- Operating Systems/conversion manuals
- User manuals for: Intelligent Terminals; UNIX & 'C' - microprocessor development systems; commercial systems
- DEC BASIC programming manuals
- Telecommunications minis
- Systems Descriptions - IBM System 38
- Process Control - sales and technical documentation

Ref: 01/10

## Software Engineers Beds

To join a team developing new INTEL 8086 based machine tool control systems utilising a common core of software. Several projects are currently envisaged - some still in the early design stage.

Applicants should have 2-3 years Process Control/Real-Time experience using INTEL and PL/M. A knowledge of ASSEMBLER would also be a distinct advantage.

A realistic salary and benefits package together with excellent future prospects in a challenging software development environment makes this a first class opportunity. Ref: 01/11

## Analysts & Programmers Surrey

The computer services division of an international group have a number of vacancies for Analysts and Programmers with experience of commercial applications on PDP 11 and/or VAX machines. These positions will involve customer liaison, implementation of new systems and enhancement to their existing ones.

Successful applicants will be professional, self-motivating, enthusiastic towards their work, effective communicators and smart. Ideally you will have 3 years relevant experience using BASIC, BASIC+ etc. and salaries will be based on this. Ref: 01/12

Take this opportunity to discuss these and other requirements by phoning Hitchin (0462) 87141 or write to:

Marketing & Recruitment Division  
Industrial Artists Limited  
21 Bancroft, Hitchin  
Hertfordshire SG8 1JP. Telex: 828146  
IA is a registered Employment Services licensed by D.R.E.

Ref: L/16/F

10 NO SEASIDE

1737

Industrial Artists Limited

## Designer/Programmer

Our client requires Designer/Programmers to work on an advanced communications/information switching system.

Although working in a project team environment, candidates will have the opportunity to assume responsibility for specific tasks from the design phase through to implementation. The ability to apply initiative, communicate effectively and work without close supervision is important.

Experience of COBOL and/or TAL, or a similarly structured language (e.g. CORAL) is essential; combined with communications experience in a Command and Control environment this would be ideal.

For further information please contact Jenny Dalrymple-Hay or Ian Murray West on 01-493 2947, from 8am to 10pm, Monday to Friday, or weekends. Jenny Dalrymple-Hay on Beaconsfield (04946) 4579 or Ian Murray West on (0908) 563415 quoting Ref. 9992.

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TRW Carr Limited is a major UK manufacturing division of a large American corporation employing over 450 personnel in this country. The company are on the threshold of major software developments and a significant hardware upgrade which is currently based on an IBM 4331. A vacancy now exists for an Analyst/Programmer to assume a senior role within the department and we are seeking experience in any of any of the following areas:

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In return TRW Carr offer competitive salaries and a comprehensive benefits package including annual bonus and company membership to BUPA.

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JM322/1

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LOCATION: LONDON

JM322/3

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We are now looking for specialists whose skills will make an immediate and valuable contribution to our operational effectiveness. We need a number of Programmers to join small teams working in Manchester, Liverpool, Preston, Lancaster and Blackburn, to develop end-user software for non-engineering systems.

As well as 2 'A' levels and 5 'O' levels including English Language, you should have experience in basic computing skills including programming (PL/I, MBASIC and COBOL), database utilisation particularly RAMIS, and the use of packages available as programming aids. Expertise in IBM operating systems would be an advantage.

Your starting salary will be within the range of £5,058-£8,603, rising to a maximum of £11,725 (currently under review).

For an application form and further information please ring Joan Parish on FREEFONE 0614, or write to her at British Telecom, P1242, 91 London Road, Manchester M60 1HQ.

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(4703)

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(A subsidiary of Leigh Instruments Limited of Canada) Design manufacturers of avionic equipment including digital recording systems and support equipment. To meet an expanding activity in these fields, we urgently require the following personnel:

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LOCATION: NORTH EAST

JM322/4

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(722)

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CAERNARFON

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To provide this training

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## SALES BIT

Getting to know Compec North's traits

IN CONTRAST to my experience of the Olympian Compec, I found the visit to its counterpart, Compec North, a pleasant one.

There was plenty of room to move around in an environment shirr-order warm, as Mid-Summer Day for once fulfilled its obligation. We were free of the oppressive clamour that greets the visitor to the jolly, bustling London event.

For those with childhood memories that still saw lazy lions and tired tigers roaming in the now neglected no-man's land of Belle Vue, it was a nostalgic return.

Through the broken netting and silent turnstiles, I could still hear the maddening monkeys and rowdy roundabout of many years gone by; the illusion shattered by a tense technician, tired of trying to teach his tardy terminal to talk, staggering angrily to his electronic ambulance and dumping it disconsolately in the computer cluttered boot.

My main experience of the day occurred as I entered the exhibition. A glance into the hall established that there were not as many people as the big Compec draws, yet the queues at the registration points were several times longer than I have ever witnessed at Olympia.

There was a computer related checking-in system, you see, and as any Luddite will tell you, that's where all the trouble begins.

Attendees were asked to enter complete personal details on a formal data-entry form. The allowance of only two lines for the complete postal address was unlikely to have had the blessing of the Post Office or of those asked to provide the data.

As we waited, there was time to observe that one terminal was already out of action and being attended by two exasperated engineers, whilst in the adjoining position a very slow typist tried desperately to make a reluctant plastic card fit into the embossing device.

At last my turn came about for the initiation ceremony. Unfortunately, but not unexpectedly, my approach and said: "Let me tell you about our financial planning services."

Positive and informative, that's the way you need to be at an exhibition. Don't wait for buyers to approach you. Ask questions that get people involved.

Eventually, the time came for leaving. It had been an enjoyable, even rewarding day, but one thing fell short of Olympia - I didn't meet even 10% of the friends and acquaintances I would normally expect to see at Compec. Whether that was a function of numbers or the youth of most of the exhibiting companies is a matter for speculation.

"For what?" I asked.

"For anything you want to know," answered the typist.

I never did find out what to do with my enquiry card.

I completed my initial tour, having absorbed as much of the exhibition as I thought was relevant, and settled down with a plastic pint of fizzy shandy to consider what I had seen. If you took away the microcomputer suppliers, communications, peripherals and consumables, there wasn't much left. No sign of the major league, other than Digital Equipment.

It was all about the new, the small, the entrepreneurial and the "let's hope we'll still be in business next year" companies. It was interesting, exciting and left one wondering how far the cost/performance of computing could